JPRS-UST-94-005
10 February 1994

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JPRS Report

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Russian Academy of Sciences 'Demands Saltykov's Blood'

947A0028B Moscow SEGODNYA in Russian 11 Jan 93 p 10

[Article by Vladimir Pokrovskiy: "The Academy Again Demands Saltykov's Blood"]

[Text] From what we see on the television and read in the newspapers we know that Yuriy Osipov, president of the Russian Academy of Sciences, is extremely concerned with the financial situation of academic science and is especially upset by the circumstance that an individual item "Russian Academy of Sciences," the backbone of Russian fundamental science, has disappeared in the draft budget for 1994.

Yuriy Osipov blames the loss of the item directly on two Borises: Boris Fedorov, Minister of Finance, and Boris Saltykov, Minister of Science and Technical Policy. In the opinion of the RAN (Russian Academy of Sciences) Presidium, which was expressed on 14 December in an appeal of the academicians to Boris Yeltsin, these two ministers are intentionally and systematically destroying the Academy. A resolution of the RAN Presidium dated 21 December already contains a threat of public denunciation of the mentioned Borises.

In the appeal to the president the indignant scientists proposed that an end be put to this disgraceful situation and that all fundamental research in the country be conveyed to the oversight of the Academy of Sciences and that the Ministry of Science and Technical Policy be eliminated. The leaders of the Academy are by no means submitting this appeal for the first time. But for the first time all these conversations are no longer confined to the offices and are reaching a broad public. And perhaps for the first time the "immortals" are quite close to their desired objective. The dogfight has ended and war has been declared.

The Ministry of Science and Technical Policy is being bombarded with angry telephone calls: "How could you? How dare you leave academic science without funds for its existence?" Andrey Fonotov, the deputy minister, shrugs his shoulders in perplexity. In his opinion the panic arose due to a misunderstanding.

"We thought that this matter was settled long ago. After all, the new draft of the budget in which this item is missing was sent out to all interested departments last summer. And it was not the Academy, but we who drew the attention of the Ministry of Finance to this detail. The draft was very inept and we sent it back with a great many critical comments; on 28 October the ministry agreed with our criticism and the Academy item was returned to its rightful place. It is strange that Yuriy Osipov was not interested in learning the true status of matters from the Minister of Science and Technology before dashing off one denunciation after another."

But, from all appearances, the RAN president did not clarify the status of matters because this was not in his interests. Available facts make it necessary to assume that he had to have a panic precisely at that postelection moment when Boris Yeltsin announced an impending reduction in the number of ministries and their personnel. The panic was necessary around any problem, even if it be nonexistent. We find it difficult to believe that the leaders of the Academy, with all their friendly relationships to the president and prime minister of the country, had no access to the last draft of the budget.

But the facts are as follows. Already on 14 September Nikolay Malyshev, an advisor to the president of Russia on science and education, sent a memorandum to Yeltsin in which he proposed that of which the RAN Presidium is now proposing—conveyance of all fundamental science to the oversight of the Academy and abolition of the Ministry of Science and Technical Policy. Then the dispersal of parliament occurred and the seat of Boris Saltykov for the first time in many months ceased to shake. The Minister of Science and Technical Policy as a member of the Gaydar camp during this unconstitutional period was completely untouchable. As soon as the elections had ended in the way we know they did the Malyshev memorandum with the presidential decision "examine" was laid on the desk of Yegor Gaydar.

The Malyshev proposals taken separately could scarcely harm the ministry—the accusations made so little corresponded to reality. The ministry was accused of an excessive expansion of staffing at the very same time when the personnel rolls were being significantly reduced; due to low salaries people are now fleeing from the Ministry of Science and Technical Policy. The ministry was accused of working "in the old style" in that no one there was occupied with anything but "petty details and the distribution of funds." But it is hard to call a "petty detail" the organization of new structures of the state scientific center type, which has literally rescued from collapse several tens of very large scientific organizations in the country. It is difficult to call work "in the old style" the method, completely new for us, for distribution of funds by scientists themselves: reference is to the organization of a Russian Fund for Fundamental Research. This fund, incidentally, despite all the criticism directed at it, has invigorated much neglected research. "Instead of complaining," said one scientist, "we are now filling out applications for grants."

In a preelection meeting with scientists Boris Saltykov spoke of establishing a similar fund for specialists in the humanities, a Technological Fund, the possibility of establishing a fund for payment of thousand-dollar stipends to representatives of the scientific elite of the country. Now everything may end in a crash.

The Malyshev proposals, supported by the surprisingly similar proposals of the RAN Presidium, multiplied by a precisely selected moment in time, may still topple the

minister hated by the Academy. According to information from the government apparat, a paper already lies on the desk of Boris Yeltsin providing for the abolition of the Ministry of Science and in its stead the organization of a department of science affairs. Malyshev, naturally, is to be named to this post. He once was the former Minister of Science and Technical Policy, sure, for an entire month.

"The ministry in its present-day form is not the most ideal structure for leading science from a state close to clinical death," says Aleksey Zakharov, a member of the Russian Consultative Council of the International Science Fund, an active supporter of science reforms, who more likely could be called an opponent rather than an admirer of the Ministry of Science and Technical Policy. "The ministry is frequently criticized and at times very correctly. Like any Russian department it acts very slowly and each new thing that comes along—be it regulations on preferential taxes for international philanthropic organizations or the setting up of a new fund—is dealt with only with excessive difficulty. However, this is the sole department which is taking steps in the right direction, something not characteristic of Soviet administrative methods. If the ministry is abolished and the funding of fundamental research is returned to the Academy Russian scientists might as well put on mourning- hopes for improvement in the situation are low even without this and they will decrease virtually to zero. Experience has shown that the only thing which the leadership of the Russian Academy of Sciences can do effectively is to ask for money. The Academy Presidium is not capable of carrying out reforms making it possible to conserve scientific potential because any of these reforms lessens its authority. It is capable only of dragging out the agony and making it irreversible."

A short addendum to this article.

The poor Russian Academy of Sciences, constantly whining about budget support, has at its disposal, for example, several recreational facilities, including one held jointly with an Austrian company—the five-star "Palace Hotel." Still another five-star hotel is located on the grounds of the Organic Biology Institute, Russian Academy of Sciences, where an automobile shop also is in operation. Just what is done with the considerable hard currency receipts is unknown. In particular, in checking the Palace Hotel one discovers unaccounted for cash receipts of 860 thousand real American dollars belonging to the Academy. It must be surmised that they were not very necessary to the scientists or have been laid away for a rainy day.

Budget Decisions Anger Russian Academy of Sciences

947A0028A Moscow SEGODNYA in Russian 30 Dec 93 p 8

[Article by Veronika Romanenkova: "Russian Academy of Sciences and Ministry of Science Play Montague and Capulet. The Story of an Item in the State Budget is Coming to a Head"]

[Text] For the first time in the almost 260-year history of the RAN (Russian Academy of Sciences) eight of its institutes in December announced their intention to cease work if they do not receive dependable state funding. It is true that for the time being it seems that this threat has not been carried out. At a conference of the RAN Presidium with the directors of the scientific institutions of the Moscow region, Yuriy Osipov, RAN president, reported that Viktor Chernomyrdin gave him the "word of the prime minister": in the very near future the Academy will be paid the 24 billion rubles which are due it. It is true that the Academy president shared with a SEGODNYA correspondent serious doubts that the money in actuality would be forthcoming.

In the budget for the fourth quarter it was provided that the RAN be allocated the sum of 36 billion. But the scientists have received only 12 billion. And such a situation cannot be called chance because it has already been repeated several times. As is emphasized by presidium members, even if all the promised money is paid, it is nevertheless inadequate. That minimum of the sums which science will receive from the state budget goes exclusively for salaries of specialists and payment for communal services. Scientists are simply beginning to forget about the purchase of instruments, materials and reagents.

Moreover, in the draft budget for 1994 there is no item for funding the RAN as an independent organization, as has been the recent practice. An individual line in the budget enabled scientists independently to distribute the scanty allocations in accordance with their own needs and considerations. The present-day draft "means the virtual abolition of the RAN," assert its leaders.

Not having received money for the fourth quarter, the leadership of the Academy lost patience. The RAN has now already long waged "trench warfare" with the Ministry of Science and Technical Policy, which implements state scientific policy and handles the "science money" passing through its hands. Indeed, one of the principles of the strategy of the Ministry of Science is the concentration of financial resources in the most priority fields and the organization of federal scientific centers, as follows from this, in which this money will be concentrated.

Now the RAN Presidium has decided to speak out openly against the Ministry of Science and Technical Policy. "The RAN Presidium regards the prevailing state of affairs not to be the result of the random course of circumstances but a manifestation of systematic work on abolition of the Russian Academy of Sciences," it states in its resolution. "If the prevailing state of affairs is not rectified in the very immediate future the RAN presidium in the name of rescuing Russian science will be forced to take an extreme step—publicly expressing its lack of confidence in the Minister of Science and Technical Policy and the Minister of Finance, whose actions in essence are directed to the destruction of the RAN and national science."

Even now the leadership of the Academy has decided to ask the president and prime minister of Russia to establish a State Council for Science, Scientific-Technical Progress and Education under the president of the Russian Federation as a higher consultative agency for working out a strategy for a state scientific and scientific-technical policy. It is recommended that the council "be made up from among outstanding scientists having the recognition of the international scientific community," evidently having in mind members of the Academy. Moreover, the RAN presidium considers it desirable "to transform the Ministry of Science and Technical Policy into a State Committee for Science and Technology," substantially abridging its functions, and keeping under its oversight only "matters relating to organization, structuring and oversight over implementation of state scientific-technical programs."

It is difficult to say how the officially declared war of the two science families will end. Its outcome will depend to a great extent on the personal disposition of the higher leadership of the country. For the time being it resembles a "pendulum," swinging first in one direction, and then in the other.

Meanwhile, as strong worlds quarrel one with the other, a great many so- called academies are appearing, specializing in all possible branches, and ever-wider spreading their wings. Organized as independent structures, they now are more and more frequently having success in wrangling budgeted money from the state. Just what are these academies? As a example it is possible to cite an excerpt from the unusual publicity prospectus of the MIA (International Academy of Information Science), recently promoting a forum on information science: "The enterprises, organizations, institutions and private individuals participating in conducting of the forum for a sponsor's fee in the amount of 300 thousand rubles are elected without competition to regular membership in the MAI and the director is elected as an honorary member of the Academy."

Kazakh Scientist Expects Little Support From Commercial Sector

947A0026B Almaty KAZAKHSTANSKAYA PRAVDA in Russian 30 Oct 93 p 2

[Article by Igor Kuchin, senior scientific specialist, High Energy Physics Institute: "The Fate of Science—In the Hands of Politicians"; the first three paragraphs are an introduction]

[Text] Now we all are involuntary witnesses of the ruinous consequences of a breakdown in businesslike cooperation in the economy. Politicians already are beginning to correct the twists and turns which have occurred during sovereignization of the production sphere, to seek out the "extremists," those who first said "no" to a partner and began to build a wall around their own territory. Meanwhile in science (yes, and probably not only in science) the cessation of normal relations among work partners is continuing to be aggravated. It is not what scientists want, but seemingly is occurring by itself by reason of some objective factors. Evidently in the last analysis the same strong factors are operative here as in the economy. And the consequences of this quiet process of calamitous self-isolation may be not less destructive for the growth of scientific potential in the republic and the development of the country as a whole. Accordingly, it is important as quickly as possible to stop the general disintegration of the intellectual sphere of activity before its results become irreversible for us. When Kazakhstan was part of the Union our science was included in the common information pool of the country. The central scientific library of the republic Academy in a centralized system received from Moscow the books and journals published in the USSR and abroad. Now the operation of this system does not extend to us. They explain to us: there are no funds available. In one way or another the flow of scientific information to the republic has been cut off. We have been left without a number of international journals in the English language in the fields of mathematics, physics and other disciplines. Our director then declared: "Seek out partners, establish contacts with the necessary authors, ask that they send reprints and preprints. You certainly understand that without information we cannot survive! However, money also is needed for maintaining contacts with the respective parties... The other day our institute was visited by a group of Chinese scientists. It was headed by Chou Huan Chao, president of the Chinese Academy of Sciences. This was not the first visit of Chinese colleagues to our institute. Already six years ago applications were finalized for carrying out joint research in different fields of high-energy physics and plans were laid for carrying out joint balloon experiments in the stratosphere. The negotiations ended without results: neither country had the necessary funding and equipment. Nevertheless Kazakh and Chinese physicists found a basis for carrying out joint research—in third countries. Our scientists and specialists in four major scientific institutions in China (at Beijing, Shanghai, Wuhan, and Linfen) and the scientists of other countries with the support of Moscow colleagues are entering into a major international collaboration (cooperation sphere), are studying the interaction among different nuclei and photoemulsion nuclei in a broad energy range. A number of interesting results were obtained and 14 joint studies were published. But Kazakh and Chinese physicists cannot meet and talk in a neighborly way. To be more precise, we cannot. The tenth meeting of participants in this collaboration was held in September 1991 in Wuhan. The scientists of our institute also received an invitation. But they did not go: there was no money for missions abroad. This time invitations to China and proposals for cooperation no longer followed. But, indeed, at the meeting there was discussion of the difficult times that had arrived for fundamental research in some countries... So an outright disgraceful situation has arisen for an independent country: in order to meet with a work colleague who lives right here, not far away, "over the mountain," it is

necessary to go to Moscow or await an invitation from Sweden, where the collaboration center is located at Lund. It goes without saying, if the trip is at the expense of the inviting party... And this is not the sole example when the friendly hand of support extended from abroad is not being met with a return handshake on our part. For a long time our institute cooperated with the Physics Institute at Lodz University (Poland). Joint research was carried out, there was an exchange of work results and scientists and plans for the future were laid. In 1991 the Poles proposed that in the spring of the coming year a small working conference be held on "Simulation, Theory and Experimentation in Cosmic Rays" at Almaty. And it also was planned that this conference later become traditional, that it acquire a solid international status and that different countries participate. But again everything was cut off due to the lack of money; the Academy at that time (in 1992) did not have 30 thousand rubles for meeting the minimum expenditures on the reception of guests. It was evidently difficult for the Poles to believe this. They broke contacts with us and the traditional protocol on cooperation was not extended. In actuality, what sense does it make to maintain relations with such an incapacitated partner! In search for a solution they say, seek sponsors, involve yourself in commercial activity, organize joint enterprises and companies, and continue scientific work. They cite the example of Japan, where reliance is on practical research carried out by large private companies, or China, where scientists are put on a self-supporting basis. We regard such a recommendation to be fallacious at its very core. And it is strange to hear it from time to time from the "generals" of science. At best it is suited for solution of the problems of a limited number of individuals, but not science in general. The fact is that for the time being in the republic there are simply no such large industrial companies which would be in a position to assume a considerable fraction of responsibility for the growth of scientific research and the development of new technologies. Our private entrepreneurial sector only now is beginning to stand on its own legs and is absorbed in its own problems of survival and initial accumulation of resources. It is not up to sponsorship at such a scale as would be necessary for the normal functioning of science. For the time being the government remains the sole "sponsor" for science, culture, education, medicine, etc. The market for individual entrepreneurship in our country is extremely limited and specific. It cannot be accepted by all who do not wish to switch suddenly from the good life to trading in computers or selling beverages in the streets. Incidentally, for those not in the know, the heads of the researcher and creative worker are not at all tuned like those of a merchant or broker. Accordingly, to combine business, science and art is difficult for a normal person with a psyche not operating on two frequencies. And finally, and most importantly: perhaps it is not evident that all this feverish individual activity of scientific workers in the search for sponsors, grants and money for acquiring computers and equipment, trips abroad and return reception of visitors has a single result: rapid breakdown of scientific potential. The same as the departure of people for commercial organizations or the "brain drain" abroad. And this potential, indeed, has been built up in Kazakhstan over the decades and constitutes a treasure of the republic. And it is of great importance for the movement of people along a civilized development path. Will we select backwardness? The tragic situation in which Kazakh science has found itself, it is believed, is caused not so much by the general economic crisis, which in itself is secondary, as by the mentality of the influential part of society, a systematic undervaluation of that role which science plays in our time, in general, for the intellectual potential of the country, for the growth of the well-being of people and the prospects for its further development. With respect to the number of people involved in intellectual spheres of activity, with respect to the importance for the future development (or degradation) of society, the problem of the fate of science in Kazakhstan is now already acquiring a political ring. Like litmus paper, giving evidence of the course of a reaction in one direction or another, the prolonged neglecting of science indicates a voluntary (or involuntary) choice of a definite variant of the development of events: a choice in the direction of backwardness. In actuality, when Japan after bitter damage in the Second World War went to work on restoration of its economy it also experienced an acute need for money and received material assistance from the outside. And nevertheless it proceeded to a sharp increase in expenditures on fundamental research and development work. During 1948-1949 36.7% of the budget was allocated for these purposes. Because its leadership elected a path of development by increasing the intellectual capabilities of the population and on this basis the mass use of advanced foreign methods and equipment. There's an example of resoluteness and faith in their own capabilities! Against the background of Japan and other countries attaining rapid progress due to an intensification of the intellectual sphere of activity, the slow "financial" stifling of science in Kazakhstan is perceived as a sort of act of national suicide. Again and again I want to ask our powers that be: "Do you need science? If not, it is interesting to know how, relying on what social forces, you intend to ensure the proclaimed strategic development of the republic, the flourishing of the people and growth of its prestige in the world?" In order to accelerate democratic and market transformations in society there must be profound changes in the consciousness of the people, a radical breaking away from the stereotypes and mentality which have developed. With the present-day psychological mood of society it is difficult for scientists to count on any full recognition of the usefulness of their activity and receive everything which is necessary for carrying it out at a fitting professional level. It seems that in Kazakhstan there is a need for a union of science and politics.

Kazakhstan Unable to Maintain High-Level S&T Training

947A0026A Almaty KAZAKHSTANSKAYA PRAVDA in Russian 5 Oct 93 p 2

[Interview between Raisa Dobraya, KAZAKHSTANSKAYA PRAVDA correspondent, and Kupzhasar

Naribayev, rector, Kazakh State University; "We Will Not Erect a Tombstone Over Science"; the first paragraph is an introduction]

[Text] It is known that the situation of our science, expressing it gently, is not easy. A high percentage of young people have been drawn into the business world. A hundred times more money can be earned in deals, in buying and selling, than behind the desk at any, even the most important scientific research institute. After graduating from lower schools, preference is given to the economics, law and commerce faculties and to universities. What is being done in order to enhance the image of the so-called nonprestige science faculties, such as is the situation for education in general in our country, and is there still a pull of young people toward science, despite its present day status? These matters are discussed by Kupzhasar Naribayev, rector of the Kazakh State University imeni Al-Farabi.

Naribayev: I cannot speak for the entire educational system. We now have a good many higher educational institutions, including private ones. But our university, the oldest in the republic, is intended for training specialists in the fundamental sciences, and without question there are difficulties. Although I assume that we somehow like to paint a dark picture and, incidentally, constantly lay it on thick. Now is a complex period, but I figure that a solution will be found in one way or another. I think it would be incorrect to say, for example, that we are erecting a tombstone over science, on which the very development of society is dependent. In the most difficult time a Ministry of Science was organized, which, incidentally, does not fund groups, as was the case earlier, but scientific projects. But many scientific organizations have been accustomed to being funded in advance and at the present time they are left confused. We, however, have received about 1.5 billion rubles, demonstrating the timeliness of the themes which we have proposed.

It is difficult for science and the education system, but it is indeed clear: that country wins out which devotes attention primarily to them. If we, let's assume, purchase technology in the West, it must be adapted to our conditions. Who will do this? Yes, scientists are going into business and students are engaging in it. The budget is weak. Businessmen produce nothing. It is necessary to have a system of laws which will favor the development of goods production and then specialists also will be needed.

This time, I am sure, will come. The state, recognizing the problems involved in our own development, must determine the special role of science and education even against the background of deep social and economic difficulties and do everything for their thorough development.

Dobraya: Kupzhasar Naribayev, and what now is the flow of those entering the science faculties: physics, philosophy, chemistry?

Naribayev: It seems that it's not that small, the true devotees of science have not been diverted. Yes, and to call these faculties nonprestigious due to the fact that there is a not very high competition for entrance would be incorrect. After all, today there are many who are simply materially unable to allow themselves travel for study in the capital and because of this the flow of those matriculating in the higher educational institutions in Almaty has been reduced. It is precisely the university graduates who must develop and further improve new highly scientific technologies in different branches of physics, chemistry and biology and their knowledge is the basis for the further development of nuclear power, environmental protection and the development of new materials. And this sort of activity cannot be called nonprestige.

As the economic situation stabilizes it also will be natural to expect an increase in the motivation for study in the natural science faculties. The formation of such a long-term motivation requires a definite period of time.

Dobraya: What is the percentage of foreign students who are selecting the university?

Nabirayev: A total of 257 persons from 29 countries of the world, which is 1.8% of the total number.

Dobraya: Are they coming from America and Europe?

Nabirayev: Yes, there are students from America, Germany and Poland. Our education is recognized in the West.

Dobraya: But it is assumed that this is not the case. Is it not true that our diplomas are not valued there?

Nabirayev: It is impossible to make such a categorical assertion that our diplomas are not valued in the West. This problem has its juridical aspect. In world practice there are agreements in force among countries on the reciprocal recognition of certificates of education. The former all-union model of education, having primarily an ideological character, naturally could not be a partner of the Western system for the training of personnel. Indeed, in actual practice there have been no forms of cooperation with the West in the field of training of personnel that would make it possible to speak of any discrimination against our diplomas. In individual branches, such as in economics, there could be no such cooperation. But nevertheless the quality of training of specialists, especially in the natural science fields of specialization, in our country always was and still is at a sufficiently high level for it to be recognized in both Europe and America. Here we have the example of numerous cases of successful cooperation between our scientists and those in the West in different fields of science and technology. Our graduate students and young scientists are successfully working in research centers in America and Europe.

However, the radical transformations now transpiring in the education sphere in our country have the tendency

toward organization of an educational system more adapted to world standards. Since 1992 our university has switched to a two-level teaching system such as adopted in many countries. And beginning with the current academic year this system has been introduced in a number of other universities of the republic. Such a changeover was not at all dictated by any striving to imitate the Western instructional system. It must be noted that in world practice a high evaluation was given to the former Soviet education system based on 5-6 years of instruction. But from the point of view of the feasibility of the expenditures on such an intensive training of specialists, most of whose knowledge then remains unused, it is preferable, to be sure, to have a multilevel structure of education.

The striving for an increase in the quality of education induced us to study the experience of academic institutions in many countries in the field of monitoring and evaluating the knowledge of students. The rating system for checking the knowledge of students introduced in our university incorporated the most effective and optimum approaches to the certification of students and is combined to the maximum with the multilevel training of specialists.

We are inviting the cooperation of Western specialists in the market economy and international law fields in the training of our people. Agreements have been concluded on cooperation in the field of training of personnel with universities in France, Japan, Great Britain, South Korea and Turkey and for the second year joint work is being done with the World Bank in Washington on the retraining of our instructors in the principles of a market economy. All these measures, it is believed, will facilitate an increase in the quality of instruction in our university.

Dobraya: Is there a plan for work with the gifted?

Narlbayev: There is. Our instructors are participating in olympiads, such students are assigned to assistant and full professors, are carrying out individual types of departmental work and are being sent abroad for study. But, unfortunately, only those can remain as graduate students who have material resources: a very small stipend. And I also wish to add that there are few applications for specialists to enter from scientific research organizations. On the one hand, to be sure, they themselves are not in the best situation: they are being cut back and are poorly funded, etc., but in science there always is a need, so to speak, for a new infusion, and then it will develop. This is one of the reasons why our students, even talented ones, are going into the business world. A sign of the times, but we will hope that it is temporary.

Dobraya: University science earlier was regarded as a pariah. It was assumed that fundamental science was being developed only inside the walls of scientific research institutes. What's the present-day situation?

Narlbayev: Fundamental science is developing in the Academy of Sciences and in our university. We have large laboratories and three scientific research institutes have opened: theoretical and experimental physics, new chemical technologies and modern problems in biology. A scientific research humanities center is in operation. We intend to open institutes of applied mathematics and ecology. But there is a very difficult problem: science and production are not working hand-in-hand and for the time being tests are being carried out nowhere in the country. Once again it remains to hope that these are temporary difficulties. Just take a look, the realities of today are unquestionably imposing an imprint on the educational process. One would think that against the background of a decline in the prestige of education it would be natural to expect a decrease in the general intellectual level of the student body. But each year we are meeting at the university threshold young people desiring to study Persian and Japanese literature, the history of the Far East, space physics, the theory of numbers, genetics and molecular biology. Precisely these young people constitute an enormous intellectual potential for our country. Without such young people we cannot construct in our republic that which we want to build. A tombstone must not be erected over science.

Saltykov Defends Russian S&T Ministry's Policies, Actions

947A0025A Moscow POISK in Russian No 49, 10-16 Dec 93 p 3

[Interview between Boris Saltykov, Minister of Science and Technical Policy RF, and Olga Kolesova: "The Winter of Our Science"; the first two paragraphs are an introduction]

[Text] It is cold in the unheated offices of Academy institutes in Siberia. There also is cold in the hearts of scientific specialists forever awaiting budget reductions or a simple cutback. The most warmth-loving long ago were drawn to the south, but more likely to the west...

Our correspondent took advantage of a visit of Boris Saltykov, Minister of Science and Technical Policy of the Russian Federation, to Novosibirsk, to inquire when there might be a thaw for science.

Kolesova: Boris Georgiyevich, two years in the ministerial seat these days is not a short time. So many changes have occurred that each year one can count on three, and maybe even ten. Have you had a change in your points of view on the goals and methods for the reformation of science?

Saltykov: There has been a definite evolution in points of view, I think, among all members of the government and among all the citizens of Russia. We began reforms in 1991 without having had any practical experience in carrying them out and therefore there was a definite idealism, purely theoretical ideas of what had to be done.

On the whole the strategic ideas on the principal goals of science reform have almost not changed. However, the

forms, the methods and the sequence of different measures had to be changed as we went along, taking the developing economic and social conditions into account. It was immediately clear to us: the model of science which had been adapted to the administrative-command control system inevitably had to be changed because by that time the system had already changed. By late 1991 all the branch ministries had collapsed and this means that all the branch science which they fed had already come apart at the seams. It was necessary to construct new mechanisms, to devise new structures for its funding and control.

The idealism was manifested in the fact that we clearly had underrated the stability of the old system, its capacity to resist. When reforms began in the economy science (however, like culture as well) suffered more than other branches. This was not the fault of the Ministry of Science and Technical Policy, but its misfortune. A substantially lesser growth of prices was predicted for early 1992. We anticipated that in 1992 the budget would be reduced by 40-50%, but the results for the year showed that it had fallen by almost a factor of three. This was a shock for science. And our role under these shock conditions was to react rapidly, to devise survival mechanisms. In short, whereas initially the first priority was to bring the system for organizing and funding science into line with the conditions of the expanding market, by the spring of 1992 the problem of elementary survival had already arisen. And it was important (this, incidentally, was the most difficult task) to save the best, sacrificing—if necessity dictated—that whose loss would not exert too great an influence on the scientific capabilities of the country. To be sure, the principal difficulties arose in the choice of priorities due to the enormous inertia of the former system. Let's say that we inherited about 40 scientific-technical programs—strongly validated, organizationally formulated, but in many respects no longer corresponding to the needs of 1992, much less 1993. It was very difficult to change them. A start was made by replacing several program directors.

In general I would say as follows: life constantly teaches its lessons. The changes which occurred dictated that we take new approaches. For example, the implementation of the program for state scientific centers in early 1992 was planned in a different form. But the crisis in branch science already by late 1992 forced a search for new forms of immediate assistance to the best scientific and technical organizations in Russia.

And evolution of points of view of the type: we thought, it is necessary to go to the market, but now we understood that it was necessary to leave everything as it was, something which, Thank God, did not occur. In general, however, the process of acquiring work experience under conditions which were unusual for us turned out to be not very easy. And this experience, especially for high-level directors, in my opinion, was invaluable.

Kolesova: "There is too much science in our country"—that is a contention with which everyone mercilessly scolds you—from academician to common folk. Do you by chance not intend to refute it?

Saltykov: This thesis in actuality was advanced by me early in 1992, but it was employed in a definite context. There was probably as much science as was required by that system which existed several years ago: a system which was ideologized, militarized, oriented on the needs of a great military power. But we changed the system: we decided that it was necessary to cut the army in half, to reduce unnecessary expenditures on defense because precisely they stifled the civilian branch (we had five times more tanks than did the United States!). Accordingly, in our country there came to be many who were employed in the research, development, testing and engineering fields, especially those who were related to defense orders. This does not at all mean that we have too many educated or too many talented people (and sometimes it is precisely so interpreted to me). But it is just the other way around: the more educated and talented people there are in society, the better. But, after all, scientific specialists and engineers are not simply educated people, but people producing some product which must be required by society. Either fundamental knowledge is involved, or practical development work, oriented on industry, defense, etc. Specialists at any scientific research institute know very well that each institute has been supersaturated with people—in the distant golden 1960's when petroleum dollars flowed in a river and virtually everything which was applied for was funded. To be sure, I exaggerate, but not by much.

A civilian society, in which the interests of all layers of society are balanced, must count its resources and also must count its expenditures on science. All the time they say about me: "He wants to cut back on fundamental science." However, even fundamental science has its funding sources. It is known that even the Academy has received 30-40% of its funding from defense orders. And if we all are in agreement that expenditures on defense must be reduced, it is inevitable that the Academy will be allocated 30-40% less. Or that this percentage must be taken from another part of the budget. But from what part? At whose expense?

Incidentally, one of the results of activity of the Soros Fund was the appearance of interesting statistics. It was found that from almost a million "statistical" scientific workers in Russia during the last five years only 21 thousand have three (or more) publications in prestigious scientific journals, ours and foreign. Well, let's assume that an equal number simply did not submit applications. And, unfortunately, this is a quite objective evaluation of those really "producing" new knowledge in fundamental science! Our drama was that in our country there was a very labor-intensive (in contrast to fund-intensive) development path, including in science as well. Whereas, for example, in Europe, United States and Japan one scientist and corresponding equipment are adequate for performing any work, this would take us three researchers and five technicians. That is, we have made up for the shortage of modern equipment by work,

sometimes even work by highly skilled specialists. Accordingly, in the event of a changeover to advanced research technologies reserves will be found for reducing numbers. On the other hand, these people could successfully find themselves in such organizations necessary for a market economy as those introducing new technologies, consulting and servicing firms, certification and information centers, etc. In the technically well-developed countries this infrastructure is extremely well developed and a great number of specialists are employed in it.

Kolesova: Many provincial scientists, including those in Siberia, have suspected: the minister—in any case at the beginning of his activity—held the opinion that all science was concentrated within the limits of the Sadovoye Ring.

Saltykov: Just plain slander. I always criticized the organization of our science precisely for the fact that in the administrative system all decisions were made at the center. And certainly in this sense Moscow made mistakes in the distribution of resources. Accordingly, I am speaking out precisely for the maximum decentralization of the making of decisions, in particular, with respect to the allocation of funding.

But when they tell me that it is necessary to elect scientists to the Academy of Sciences not only from Moscow, but from each provincial city because "there are no academicians there," I protest. Despite this, members must be elected on the basis of the results of their work, not by place of residence.

Kolesova: Could you not formulate the key points in the present-day scientific policy of the government, since sometimes the fear arises that there simply is none...

Saltykov: There is a concept, and it is not the result of office meditations of ministerial officials. It was formulated together with the leading scientists of the country and was discussed at the All- Russian Conference of Scientific Workers and in the government. In the concept which is today being implemented there are two main goals: creation of new mechanisms for organizing and funding of science corresponding to a market economy and conservation of the capabilities accumulated over the course of the entire evolution of Russian science. Among the methods for implementing these goals it is necessary to mention the creation of alternative extradepartmental funding sources. This funding system is primarily governmental. One fund, for fundamental research, has already been established; we are striving to set up a second for research in the humanities. We also are approving the setting up of regional funds. Incidentally, a good example is in Siberia: the Krasnoyarsk Regional Science Support Fund.

With respect to applied science, there, as it seems to us today, two processes should be at work. First, transformation of some of the former branch institutes by means of organization of joint stock companies, privatization and merging with some production structures into companies heavily oriented on science, large or small, which will live, as they say, "from the market," filling orders of consumers, among which the state may be one. However, the institutes most important for the state itself and for the time being (or in principle) not intended for the market consumer are being transformed into state scientific centers and are receiving considerable support from the budget, although, to be sure, a search for clients is not forbidden them.

If one speaks of the entire innovative sphere, we will assume that it is necessary to develop small-scale innovative business. We allocated an item in the budget for the funding of business insurance policies and business motor pools, the "incubators of business," but for the time being there are no good mechanisms for such support.

Still another of the principal points in our scientific policy: a system for selecting priorities and funding in priority directions, finalized, primarily, in the form of state scientific and technical programs. This will make it possible to fund important research within the framework of fundamental programs having good coordinating structures: "High-Energy Physics," "Human Genome," "New Methods in Bioengineering," etc.

Another part is programs oriented on use in the economy. Here, for the time being there are difficulties because it is unclear how under market economy conditions it is possible to distribute the rights of ownership for the results obtained during work under a government program.

Finally, in the present-day difficult situation an acute problem, as before, is the brain drain and ways to contend with it. The "Government Professor" project already has been in preparation for a year. The essence of this project is the payment of the elite part of our scientists such sums as would enable them not to think of departure for abroad.

Kolesova: Insofar as I understand, this idea found its reflection, highly distorted, to be sure, in a recent presidential decree entitled "Material Support of Scientists." Under the circumstances of adoption of this decree, once again there is evidently a manifestation of the disagreement between your ministry and the Presidium of the Russian Academy of Sciences, already becoming traditional, which in no way strengthens the position of scientists in society and the government...

Saltykov: We worked on the "Government Professor" draft together, both the Academy and the Ministry. A working group was organized in the Ministry of Science and Technical Policy which included representatives of the Russian Academy of Sciences, universities and government agencies and these were the authors of this project. And we thought out the details: selection method and organization of expert councils which would include foreign scientists. But it turned out that the

preparation of the decree on "Material Support of Scientists" went right past us, it did not receive the OK from either the Minister of Science and Technical Policy or the Minister of Finance or the science section of the government.

Kolesova: Why?

Saltykov: Don't ask me. They simply did not present the draft to us.

The first point in this decree is seemingly a weak reflection of the "Government Professor" idea. But I assume that only the vocabulary of the project was adopted: "outstanding scientists," "stipends," etc. However, its essence has nothing in common with the idea of contending with the brain drain. First of all because there is violation of the extradepartmental principle. With all respect to the Academy of Sciences, it must be admitted that outstanding scientists are working in both the higher educational institutions and in the branches. It would be more natural to establish extradepartmental councils for the selection. Incidentally, this is not just my point of view—after issuance of the decree there was immediately a rain of accusations that the universities and some ministries (the Ministry of Nuclear Energy, for example, has excellent institutes at the academic level) had been forgotten.

But the most important thing is the figures: the stipend for an outstanding scientist, 75 thousand rubles, to be sure, cannot pretend to be a realization of that idea which was embodied in the "Government Professor" project. It is something else that today any money is worth getting. But this is not a project for contending with the brain drain; this is simply still another stipend for some group of scientists.

The "Government Professor" project provided for a stipend in the amount of a thousand dollars. A thousand dollars or five hundred—that can be debated—but as you see, the scale is completely different. It is not a matter of a dispute between the ministry and the Academy, but an old fear: whether the remaining scientific community will be insulted by designation of such an elite?

I have dealt a great deal with the truly outstanding scientists of our time and they are convinced: this would not happen. Any proper differential treatment, for example, when a person sells a license and receives three million, arouses no envy among colleagues because they know that this money was earned. It is far more dreadful when in such selections of the elite one or two ill-chosen, inadequate persons are included. The entire scientific community, indeed, knows what's up, who's worth what. Such accidents therefore cannot be allowed.

But in the decree there is reference to such sums relative to which the lofty words "material support of scientists" are inappropriate. For that reason as well the decree ought not have been issued; a directive of the government would have been entirely sufficient. Because scientists, to be sure, expected major decisions.

Kolesova: Both during your visit to Novosibirsk last year and today you spoke of the complex situation in the government arising due to the strong pressure of some branches. Did you make any attempts at organizing a strong science lobby?

Saltykov: Lobbying is not exclusively something Russian, it is observed in all countries. If one speaks of the relation of forces in the past parliament, there was a strong agrarian lobby there, and it also exists in the government. The organization of something similar for science is possible through an adequate makeup of the State Duma, which need not necessarily include scientists, but in any case intelligent people understanding the role of science in the fate of Russia and who understand clearly that expenditures on science must not drop below a certain level.

Kolesova: Insofar as I know, you are running from Novosibirsk Oblast in the "Russian Election." In this connection I ask the standard "Bolshevik" question: a minimum program or a maximum program?

Saltykov: I have already set forth a maximum program: to realize an increase in the fraction of the budget for science in the coming year. The minimum program is to hold at the same level. But I nevertheless will strive to achieve the maximum program because this is an entirely realistic parliamentary struggle. Excuse me for an entirely Bolshevik answer: if the "Russian Election" turns out successfully we will do everything in order to augment appropriations for science.

Kolesova: Pardon me, but here's the traditional challenge in the "Russian Election," especially for candidate ministers: you already have been in authority but expenditures on science have in no way increased.

Saltykov: That is in error. We were in authority only in 1992 and in 1993 the government became a coalition. I don't have to tell you that the authority was in the hands of the Supreme Soviet, not ours. A struggle of opinions developed, alas, not to the advantage of science, although I also must bear my share of responsibility. And nevertheless our principal task now is to achieve an increase in the fraction of expenditures on science in the Russian budget.

Kolesova: The last, purely personal question: are you not weary of all this?

Saltykov: Fatigued, but also hardened.

Foreign Aid for Russian S&T Fails to Materialize

947A0023A Moscow ROSSIYSKIYE VESTI in Russian 17 Dec 93 p 11

[Article by Igor Kosarev and Lyudmila Lesnova: "Russian Science Aid Falls Short"; the first paragraph is an introduction]

[Text] A commentary on review materials devoted to the matter of survival of science in the territory of the former Soviet Union, what is now the CIS, appeared under the indicated heading in the journal SCIENCE (September 1993).

In familiarizing readers with its content, we will allow ourselves some comments in passing. After the breakup of the Union, as the situation in Russia became more acute, the West was faced with the threat of a catastrophe associated with the brain drain, and with it also new technologies in the field of the means of mass annihilation. Even more than in the past there was a strengthened fear of the proliferation of nuclear weapons, especially their appearance in countries with an unpredictable policy. This circumstance aroused Western analysts to concern themselves with work on the matter of aid to Russian scientists.

The pursued objective was not only to retain control over nuclear weapons, but also to take advantage for themselves of the rich scientific potential of Russian scientists, attracting them to joint development work by extending financial support along the lines of both international funds and national corporations, funds and societies having adequate financial and scientific resources.

A concise prehistory of this is as follows. James Baker, the former American Secretary of State, in September 1992 conveyed to B. N. Yeltsin, president of the Russian Federation, the information that the United States was ready to make its contribution to the saving of Russian science. He promised to seek $25 million for these purposes which it was proposed be distributed among scientists engaged in the military field. This initiative received official support in Russia. Subsequently the European Community joined this initiative, promising to allocate an additional $19 million. In turn, Japan obligated itself to add $17 million for this very same purpose.

George Bush, president of the United States, assumed that in cooperative work it would be possible to maintain the scientific capabilities of Russia. He laid great hopes on the International Science and Technology Center, which was to award its first grant not later than May 1992. Sixteen months have elapsed, but this international center has not allocated a single penny for these purposes.

The Supreme Soviet of the Russian Federation in every way possible has held onto the possibility of such cooperation. Both the supporters and opponents of this idea in its ranks have become very active. The first have striven not to lose their positions in the field of the fundamental sciences where our scientists have been traditionally strong. The second have found such an alliance to be humiliating, on the one hand, and on the other hand they have expressed the fear that such a policy will favor the leakage of secret information.

However, each of the well-developed countries has sought to extract the maximum advantage for itself and has been in no hurry to allocate money to the Russians. Negotiations at the top frequently end with assurances of readiness for cooperation, but the times for allocating sums are constantly violated. The selectivity of interests also has exerted an influence. For example, the Americans have been primarily attracted by space research. They have promised Russia that $100 million will be released for use on the Mir space station and the right to conclude contracts for the launch of commercial satellites. However, our country has received only $34 million of the $250 million promised through all channels.

Long months have passed on different kinds of agreements and understandings. As a result, the process of implementing the project has assumed a drawn-out character, has begun to develop on a noncentralized basis (it always was centralized in the former USSR when the agreeing side was either the CPSU Central Committee or the USSR Academy of Sciences and different ministries), e.g. through individual private funds. One of the first who succeeded in overcoming the bureaucracy was the billionaire G. Soros, who set aside $100 million for Russian science. But it was found that just money was not enough. It was first necessary to establish a banking and accounting system, a control system, a system for expert evaluation of projects and purposeful selection of organizations and specific individuals whose activity would command the respect of American specialists and appeal to their interests.

Months also were spent on this and meanwhile a considerable percentage of the promising scientists had already emigrated from Russia. Just at the Nuclear Research Institute imeni Kurchatov 20 of the 54 scientists of the Plasma Theory Section have departed for the West, and as far as can be determined, they have no intention of returning. Scientists are unsettled with respect to their status as researchers and their material rewards.

Some foreign funds would like to avoid high taxes in their own countries and therefore are not adverse to investing sums for beneficial purposes, such as the subsidization of Russian science. However, it is not so easy to accomplish this. In the Russian Federation private individuals do not have the right to receive hard currency from abroad.

No one is fully confident that the allocated sums will reach the intended recipients because they pass through several bureaucratic levels (customs, bank, institution where the specialist works). It is not always possible to set up the base necessary for research in place. Sending the money on is complicated by high taxes.

The Americans have become convinced that the Russian side is misusing the aid sent. For example, Russian individuals in many cases travel to the United States who have nothing to do with those programs for which the sums were allocated. This circumstance prompted our American colleagues to put this work under their

control. In December 1992 the Russian Federation was visited by a group of scientists from the United States for on-the-spot familiarization with the most promising scientific centers. Without special difficulty they determined 22 research groups meriting special attention, 21 of which were immediately included in a plan for the funding of scientific work. A grant in the sum of $5,000 annually was set aside for the scientists of each group and one scientific association received $30,000 from the Human Genome fund. The money will be sent directly to those doing the work.

Plans call for increasing the number of grants, the amount of which varies from $10 to $100 thousand, under two-year scientific programs. Difficulties arise with respect to expert evaluation of the applications submitted for receiving such grants. Plans call for involving the leading scientists of the United States, Western Europe and Japan in this work. Cooperation with Western colleagues in the science field is not limited solely to funding. It is not less important to exchange scientific information [publications, holding of scientific conferences and such. In this connection the authors of publications mention the slowness in the finalization of exit visas, which results in the disruption of foreign missions of Russian scientists.]

The table accompanying this article, published in the mentioned journal, is of interest. We duplicate it in full.

Who's Helping the Russians

Initiative	Promised (millions of dollars)	Delivered (1992- 1993)	Status
Soros (ISF)	100	20	10,000 $500 grants to be awarded this fall
ISTC	74	0	Awaiting approval by Russian parliament, outlook uncertain
G. Bush initiative	25	0	Proposal submitted to U.S. congress
NSF Program	-	5	Mostly short-term joint research
NIH Program	-	7	Primarily short-term joint research
EC Association	27	0	First collaborative grants approved not yet issued
Howard Hughes Medical Institute	15	0	In June 1993 announced about 40-60 grants from $10,000 to $75,000 annually for basic biology research in countries of former USSR; equal amount for collaboration with the West
AAAS	-	0	First shipment of 2,904 journals delivered last month
APS	-	1.3	2,600 grants and thousands of journals; fund now depleted
AAS	-	0.1	Grants, journals and computers
AMS	-	0.3	450 scientists supported with $50 and $25 monthly stipends

The cited data show that as of today only the George Soros Fund has actively entered into cooperation with scientists of the Russian Federation. The others are either in the organizational phase or have already depleted their resources. Those organizations which do not publicize their intentions but make a contribution to supporting the development of Russian science arouse a definite sympathy.

A long procedure is involved in receiving grants. And this is entirely to be expected. In the West they are not accustomed to throwing money to the winds. For us it was typical to receive subsidies from the state and not always was attention given to the results of our own research. In many cases the subsidies were used by science and education officials to make trips to different countries, where at government expense they satisfied their personal curiosity and also pursued more mercantile objectives. Unfortunately, this also is no rarity today. The birthmarks of socialism do not go away rapidly.

And so it goes that foreign colleagues invite you to international congresses, you try to formalize travel documents, but the real possibility for departure is in the hands of completely other people—either ministerial workers or officials at institutions of higher education who have accomplished little in science and who are completely unknown in the West. It happens that a scientist is invited to work at the WHO and a person goes who is closer to the administrative circles of the Ministry of Health or a scientific research institute. It appears that in our system for evaluating the intellectual capabilities of a specialist, his social and juridical defensibility, we will not very soon put our house in order in this respect. That is why there is the fear that the system of grants is being used by "go-getters."

The system of grants may possibly seem to some to be humiliating. But under the conditions of negligence of science, education and public health in our country it would be incorrect to ignore it. Otherwise we risk falling completely behind in our own development, losing traditions and priorities in science. Science as a part of culture is international. A scientist has a motherland, but science does not. Its results belong to all mankind.

Foreign Investors Look at Russian Microelectronics Industry

947A0024A Moscow DELOVOY MIR in Russian 14 Dec 93 p 4

[Article by Vadim Mikhnevich and Igor Polyakov: "What We Have We Are Saving"; the first paragraph is an introduction]

[Text] A plant is being constructed at Zelenograd for the production of modern microelectronics. Despite the fact that the amount of capital investment is estimated at $300 million, specialists are sure: this sum can be recouped with profit in three years. This profit will be earned due to the sale of products in internal and world markets. Discussions of the preservation and multiplication of national intellectual capabilities in the high technologies sphere up to now resemble a dialogue between a blind person and a deaf person. Cries for assistance come from the camp of scientists and engineers; the government, which has no money, utters promises and commercial structures, scratching their heads as where to invest accumulated capital, lack the foresightedness for evaluating the essence of high technologies and to understand: a gold mine lies literally beneath their feet. However sad it is to admit, but precisely those foreign companies working in the field of microelectronics (behind which, among others, stand the major banks) sooner than our fellow countrymen understood that it would be the height of stupidity to ignore the possibilities of an enormous scientific-technical complex in whose creation they would not have to invest a cent. Somewhere slightly correct something, somewhere renovate equipment, then race for licenses for products in great demand, using the Russian work force which is very low cost by world standards. j In essence the only thing which is saving us is that in the West they know very well the value of the high technologies, which are called 21st century technologies. And therefore they are interested in not allowing the killing of the goose that lays the golden eggs. They are not interested because world practice has shown loud and clear: high technologies give a maximum yield only under conditions of an international division of labor. What this separation should be is a matter of business strategy. And now we will return to the Zelenograd scientific-technical complex, which after becoming a joint stock company, becoming privatized, was given the name Kontsern Nauchnyy Tsentr [Scientific Center Concern], the status of a juridical entity and a heap of troubles with respect to its own future. One of the first who drew attention to the capabilities of the Zelenograd enterprises was the American corporation IBM, which is known as the king of the computer market. It supplied the equipment for the Kvant plant forming part of the Scientific Center and there organized the production of personal computers and videomonitors. As they say, cheap but good. The specialists of this foreign corporation took a very farsighted look. They calculated in time that the enterprises at the Scientific Center were capable on a regular basis of replacing their company electronic components by Russian components, concluding that this in no way would exert an influence on computer quality. Later there was more. It was found that due to Zelenograd know-how it was possible to increase considerably the capacity of the computer external memory, making it suitable for use in computer networks. In the long run IBM intends in general to afford the Scientific Center the opportunity to work to the specifications of their clients, on the basis of Zelenograd computers creating new-generation information-computer control systems. Another channel for the Scientific Center to enter into the world market had already been laid out independently. Its enterprises began to supply integrated circuits to the markets of Southeast Asia—again in conformity to the specifications of the client companies. The quality of the product was quickly appraised favorably there and today approximately a third of the production of the "Mikron" and "Angstrem" plants making up the concern is exported. The reputation of the delivered products is so high that the clients pay in advance. Still more interesting for the people at Zelenograd is the story with China—it did not begin to purchase microcircuits, but the equipment produced by the "Elion" plant for the production of microcircuits in order on its basis to establish a technological base for Chinese microelectronics. The unique production lines for the production of microcircuits cost really big bucks and therefore it is in general not difficult to understand the Chinese strategy. "Elion" offers its equipment considerably more cheaply and the price differential in no way corresponds to a loss in quality. The very same thing applies to the delivery of microcircuits to Southeast Asia. Accordingly, to think that the Scientific Center has become a foreign exchange millionaire for the time being is still premature. However, it may very easily become such if it is possible to broaden the production of microelectronics and start up the plant which is under construction. The time required for paying off the 300-million hard currency credit necessary for this purpose (taking into account the interest rate of 9-12% prevailing in the world) is estimated at three years. If reliance was to be oriented on the preferential credits within the framework of conversion programs just the construction of the plant alone would require six years and during this time there would be a changeover to the next generation in microelectronics. Turning to world experience of advanced countries, it is easy to understand: investments in scientific and practical development work of electronics companies always have been and remain a profitable business. And what about our commercial banks? Indeed, if you think it over, this is a possibility which for the time being they are deprived. When the shares of the Zelenograd enterprises are given a quote on the international money market together with IBM, Motorola, Sony and other companies specializing in this field, it will already be too late. It is not necessary to speak of how much the production of the Scientific Center is necessary in Russia and the CIS. Reference is not to computer production alone. It is sufficient to recall the quality of our telephonic communications, worse than which it is perhaps

difficult to conceive. Accordingly, the programs of the Scientific Center include the modernization of the communication networks of the Moscow telephone center and the replacement of archaic electromechanical commutators by high-speed electronic commutators. For Moscow a project also has been developed for coinless automatic telephones using plastic cards. Still more far-going plans call for the development of a supercomputer on the basis of our own know-how and use of its technical solutions in the production of high-speed PC's in no way inferior in quality to similar products from IBM, Hewlett-Packard and other companies known throughout the world. Contact telephone: 531-23-60. FAX: 531-90-51.

Ukrainian AS President Stresses Achievements, Downplays Problems

947A0024b Moscow PRAVDA UKRAINY in Russian 14 Dec 93 p 2

[Article by Boris Paton, president, Ukrainian Academy of Sciences: "Science Serves the Ukraine"]

[Text] The First (Founding) General Meeting of the Academy of Sciences was held on 27 November 1918 at Kiev under the highly difficult conditions of the Civil War. This was an event of enormous importance for the Ukraine and its culture. With the appearance of the Academy the long-held dream of the progressive Ukrainian intelligentsia for the creation of such a scientific center in the Ukraine which would organize and bring together the creative activity of its scientists and put scientific advances in the service of the people was realized.

The activity of the Academy of Sciences began from three institutes, individual departments, offices, commissions, and committees. Only 140 specialists worked in all these institutions, and among them there were 12 academicians.

Now the Ukrainian Academy of Sciences consists of more than 170 scientific institutions, including 4 international institutions, at which more than 75,000 persons work. It consists of 194 academicians and 268 corresponding members, as well as 53 foreign members from 16 countries.

During the years of existence of the Academy numerous scientific schools were formed within its walls. Our Academy is among the leading scientific centers of East Europe and in many fields occupies leading positions in world science. In its creative treasury there are more than 30 discoveries and more than a few other attainments in natural science, engineering, as well as very significant research in the humanities.

Among the most significant achievements of the 1920's-1940's was the realization of an artificial nuclear reaction with the splitting of lithium atoms and the discovery of a stable isotope of lithium, the construction of charged particle accelerators, the largest for that time in Europe and the USSR, the development of a three-coordinate radar operating in the decimeter range, production of indium, liquid hydrogen and helium, heavy water, concentrations of "heavy" oxygen and nitrogen. At the same time superconductors of the second kind were discovered, the first experimental confirmation of the neutrino hypothesis was obtained and the fundamental possibility of direct thermoemission transformation of thermal energy into electric energy was demonstrated.

In addition, Ukrainian scientists have proposed highly productive flux welding and its industrial technology, a beginning has been laid for developing molecular spectroscopy and electrochemistry, the principles of the theory of electrolytes, the phytohormonal theory of tropisms and the general biological law of growth of organisms have been formulated. During the years of the Great Fatherland War the automatic flux welding of the bodies of tanks and artillery systems was organized, making possible a substantial improvement in their combat qualities and a considerable increase in production.

During the postwar period the cybernetics specialists of the Academy, under the direction of S. Lebedev, created the first electronic computer in continental Europe. Ukrainian scientists, headed by Academician V. Glushkov, formulated a theory of digital automatic devices, serving as a scientific basis for the development of new-generation computers.

Much has recently been done for the development of a number of scientific fields. An example of a major complex piece of development work carried out by scientists in different fields of specialization—in information science, physics, materials science and chemistry—is the world's first laser accumulator of data on optical cylinders using the optical immersion principle. The results of research defining the conditions for the formation of diamond-like carbon, hexagonal graphite and their mixtures, obtained by the method of high-velocity electron beam evaporation and condensation of graphite in a vacuum, are the first such results obtained anywhere.

The formulation of the theoretical principles of precision soldering of silicon nitride ceramics is of great importance for machine building. Soldered connections of steel and ceramics in the parts of internal combustion and gas turbine engines have already been obtained.

Professional physicists have established the presence of photoinduced light absorption and macroscopic quantum interference in high-temperature superconductors.

In the molecular biology field the capability of cells to change the rate of synthesis of individual γ-RNA was detected, which may find application in bioengineering, diagnosis and treatment of oncologic and genetic diseases. Academy physiologists have developed new methods for studying the functions of vitally important

macromolecules in nerve and muscle cells, have investigated calcium conductivity and other properties of the membranes of nerve cells.

New trends are characteristic for the development of research in the social sciences and humanities. The efforts of economists, jurists and sociologists have been concentrated on carrying out economic reforms and the development of the scientific principles of the structural-investment and innovative policy of the Ukraine corresponding to governmental and juridical acts.

Historians, archeologists and archeological historians are carrying out major work in restoring the material and spiritual monuments of the past and in setting up a national "Ukrainian archival and manuscript bank." Philological science has been enriched by research on the ancient history of the Slavic languages.

It must be noted that now, under conditions of an increasing economic crisis, Ukrainian science is being inflicted losses from which it will be difficult to recover. This is fraught with the most severe consequences for the intellectual potential of the people. Creative groups and the traditional bonds created through the efforts of scientists of several generations are being destroyed. The scales of fundamental research in the most promising, vitally important directions are being cut back. This is accompanied by a reduction in the general level of scientific research, is being expressed in the quality of training of scientific and scientific-technical specialists and is causing irreversible consequences in the entire educational system. The shortage of foreign exchange is contributing to the isolation of our scientists. Hence the massive brain drain. The most promising scientists are going far from the scientific sphere and are departing for abroad. All this constitutes an unquestionable threat to the national interests of the country.

The need for immediate specific steps at the governmental level is evident. To be sure, today the sovereign Ukraine for objective reasons cannot support the level of science funding characteristic of economically well-developed countries. However, it must be remembered that precisely the work of scientists in many respects favored the economic and social progress of these countries. Accordingly, under the present-day difficult conditions in order to get through the critical situation it is necessary to use the entire creative potential of the Academy of Sciences, providing it maximum support.

For us work in the interests of the Ukraine is high-priority. The most acute problem is in the fuel and energy field. Our scientists have made a detailed study of needs and our own resources and long-term scientific and technical solutions and possible directions for development have been defined. Only recently were proposals on incorporation of small deposits of oil and gas, the use of gas hydrates, mine methane, low-grade coal and combustible shales into the energy balance of the Ukraine prepared and sent to the government. Multiside[illegible] research is being carried out on the problems involved in energy conservation, the use of nontraditional and renewable energy sources. Work is being done which is related to broadening of the search for and production of oil and gas, the conversion of transportation to natural gas and other alternative types of fuel.

An exceedingly important direction in Academy activity is elimination of the consequences of the accident at the Chernobyl nuclear power station, in particular, research on the propagation of radionuclides over the territory of the Ukraine, solution of the problem of multiyear influence of low radiation doses on biological objects and man.

The Academy also is working out proposals on the development of a gold- producing industry in the Ukraine and the draft of a program for the mining and processing of precious metals and stones. We have the capabilities and in some cases also specific goals for meeting needs for new materials, as well as for maintaining and further developing research in the interests of the defense industry, and also a space program, including as a source of new high technologies for the economy. The Academy recently signed an agreement on cooperation with the city administration of Kiev for the speediest possible resolution of city management, the introduction of finalized scientific developments into production and on their basis production of competitive products with a heavy scientific input. The principal fields of cooperation are ecology, energy conservation, health protection and cultural and spiritual development of the capital.

An important aspect of the activity of the Academy of Sciences is the maintenance of existing scientific links, the broadening of its participation in the international scientific community in both bilateral and multilateral arrangements. I would like, in particular, to mention the high level of cooperation of the work of scientists of the Ukraine and Russia. Their productive activity has brought about more than a few outstanding achievements and discoveries in world science. These contacts must be maintained and strengthened for the well-being of our peoples.

Our Academy has been received in the International Council of Scientific Unions with the rights of a national member. In September, on the initiative of the Ukrainian Academy of Sciences in Kiev, the Academies of Sciences of fifteen countries signed an agreement on establishing an International Association of Academies of Sciences for strengthening the bonds between scientists of the East and West, North and South.

In conclusion I want to emphasize that the time-tested principle in accordance with which our Academy is simultaneously constructing both a community of scientists and an association of scientific research institutes has justified itself and must be safeguarded. Without maintaining traditions and a certain conservatism, characteristic for all authoritative academies in the world, neither the survival of science in these difficult times nor its development in the future will be possible.

Russian Scientists Defend Emigration

947A0024C Moscow PRAVDA in Russian
17 Dec 93 p 3

[Article by Aleksandr A. Migdal and Roald Khoffmann: "Russian Scientists Departing for the United States in Response to the Smell of Hamburgers"; the first paragraph is an introduction]

[Text] The article by Sergey Leskov, entitled "Soviet Scientists in America," published in the NEW YORK TIMES, is long and wordy. It gave rise to lively discussion in the United States. We did not deem it reasonable to reproduce this article here even in part: from the objections expressed by newspaper readers in the Letters to the Editor section in the NEW YORK TIMES it is entirely clear what it is all about. We express appreciation to those PRAVDA subscribers in the United States who brought our attention to this discussion. (The letter from Professor R. Khoffmann is published with insignificant abridgements).

Letter to the Editor: "Like many of my colleagues, I am disturbed by the irresponsible and presumptuous statements made by Aleksey Abrikosov, who Sergey Leskov quotes in the article "Soviet Scientists in America."

I am one of those who luckily survived the collapse of Soviet science. I received my post at Princeton University in 1989, at the very same time when Doctor Abrikosov became director of the High Pressures Institute at Troitsk. Like him, I am the son of an academician. Although I detested the privilege which I had, I left the Soviet Union in search for freedom and independence, and not the "good food," which Abrikosov puts so high on the scale.

I worked with Doctor Abrikosov at the Theoretical Physics Institute imeni Landau at Moscow for about 20 years. I know well the "food lines" which he discusses. The specialized elite distributor (exclusively for academicians) was located on Leninskiy Prospekt, several blocks from our apartment. There Abrikosov could have met with Doctor Roald Sagdeyev, although such a type of meeting occurred extremely rarely. The people reaching the corresponding level in the bureaucratic hierarchy had the habit of sending their personal drivers and secretaries for food products and not wasting their own time on this.

The phrase "he went hungry while working for science" is a bad translation from the Russian (I read the original of this interview in one Russian newspaper). In actuality, he said "he hungered for science," in the sense that he wanted to work in science more than he was able to do in Russia. In actuality, I understand this beautifully. After his early success in the 1950's, when Abrikosov made several surprising discoveries, he later produced nothing significant—neither in Russia nor in this country.

Such things happen with creatively thinking scientists, especially with those who began early, like he. In my case I had a similar sort of experience and in actuality, over the course of the last years of my stay in the Soviet Union I encountered problems similar to those which he describes. However, we cannot blame this on the system or on our former colleagues.

When I arrived here (in the United States—S. S.) my productivity increased. But I know that most of the ideas which I am developing here were formed there in the "food lines." Everything which we theoreticians need is a fountain pen and a little paper, plus the possibility of discussing our ideas with colleagues. All this we had at the Landau Institute: truly I never encountered a better place for work than our institute in the early 1970's.

I want to say: Russia is sick, but by no means dead. It survived a far worse crisis after the Revolution when the best brains fled from the country and Stalin dealt with whoever remained. It's like there's something in the air which generates new scientific talents and despite all obstacles induces them to develop. All these "elite" scientists about whom Doctor Abrikosov speaks are products of Russian culture, including he himself.

Doctor Abrikosov proposes that the West "assist all talented scientists to leave Russia and to ignore the others." This smacks a little of Stalinism! That amused Stalin, moving entire nations through the expanses of the empire. But what about those who love Russia, those who prefer to share the alarm of their country than to leave it, those who feel responsibility for the laboratories and institutes which they head, and those who simply are still too young to have an international reputation?

He, of course, knows all this, so why does he say such cynical things? I have an answer for that. I already earlier had heard something similar to this from emigrants, to be sure, primarily from uneducated people. This is subconscious. It bothers us that "we are eating good food," at the same time that our colleagues are suffering there in Russia. There are two ways to overcome this subconscious split personality: either assist them (our colleagues in Russia—S. S.) or convince ourselves that they do not require our assistance.

Aleksandr A. Migdal, Professor of Physics, Princeton University, Princeton, New Jersey

Letter to the Editor:

"The article entitled "Soviet Scientists in America," by Sergey Leskov, presents the contrasting points of view of Aleksey Abrikosov and Roald Sagdeyev on ways to rescue Russian science, obviously giving preference to the opinion of Doctor Abrikosov, namely that "it is useless to assist science in Russia" and that the only path to take is to help talented scientists to leave.

This is a strange and defeatist logic. I respect the right to emigration (I myself immigrated to these shores). But the superpessimistic, egoistic reasonings about emigration make me protest. Russian science in the long run will flourish because for this it has the talent and inclination and prehistory."

Roald Khoffmann, Professor of Physical Sciences, Cornell University, Ithaca, New York

Translated from English by Sergey Svistunov.

A Method for Constructing an Efficient Programmed Small Capacity Cryptomodule

947K0012A Kiev UPRAVLYAYUSHCHIYE SISTEMY I MASHINY in Russian No 3, May 93-Jun 93 pp 84-88

[Article by A. A. Moldovyan, N. A. Moldovyan; UDC 681.3]

[Abstract] A two-stage cryptographic transformation system with probabilistic selection of pseudo-randomly-long key sequences from several initial secret keys is described. This system exhibits a resitance to cryptoanalysis, based on the known initial text and the corresponding cipher, which is sufficient for any practical applications. The first stage consists of preliminary preparations when the specific transformation mechanism is rearranged, depending on the user selected password, and the second stage is the actual coding. A programmable three- key cryptomodule was developed, with a 2M bit/s coding rate and 16 MHz clock frequency for applications with IBM PC/AT type computers. With this module, it was possible to convert any initial text into a pseudo-random train of characters with code representation by binary numbers from 0 to 255. The frequency distribution of characters in the code was nearly uniform, and the rms deviation was from 1 to 10% for different texts. This implies that statistical methods of cryptoanalysis for deciphering such codes are not effective. It is pointed out that in systems with a special type of addressing to the on-line memory this method can provide much greater coding rates. Figure 1, references: 2 Russian

Optimal Rotation Axis of Satellite TV Receiving Antenna

947K0002A Moscow ELEKTROSVYAZ in Russian, No 4, Apr 93 pp 18- 20

[Article by V. V. Ovcharenko, G. P. Sumkin, V. V. Sulima; UDC 621.397.13:629.783]

[Abstract] A rotation mechanism with two rotation axes is normally required for rearranging the pattern of satellite TV antennas which would provide independent setting of azimuth and the axis' angle. Thus, the antenna can be directed in two stages to the selected satellite using its angular coordinates. However, the construction of the directing mechanism can be simplified, if the limits of the receiving antenna pattern are taken into account. Methods are described in this paper for computing accurate angular coordinates of optimal rotation axis of a single-rotation satellite communication receiving antenna, and the estimates are made of the maximum angular error in directing such antenna at specified locations, and coordinates of the satellite range of longitudes. Figures 3, references 2: Russian

Measurement of Structural Parameters of Signals, Received From Identified Targets

947K0009A Kiev IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: RADIOELEKTRONIKA in Russian No 8, Aug 93 pp 11-19

[Article by A. P. Krivelev, V. V. Chepkiy; UDC 621.396.96]

[Abstract] The coefficients of signal spectrum logarithm expansion along base function systems may be used as a recognition signature. Feasibility of joined measurement of the energy and non-energy signal parameters, reflected from targets is analyzed. Algorithms are developed for estimating structural parameters applicable to the conditions of regular measurements. A system is examined of structural parameters for targets' identification. Spectrum analysis of complex signal envelopes reflected from the "i" and "k" class signals indicate that they exhibit values of structural parameters β_ν and α_ν. For example, the absence of parameters β_ν and α_ν at $\nu>2$, constitute a characteristic feature of the spectrum of signals reflected from radar targets, combined in a class of single targets. Therefore, these parameters may be used as signatures of multiple-point targets in the background of single-point targets. References 5 Russian.

Accumulation of Perturbations and Correction of Motion of Dynamic Systems

947K0030A Kiev AVTOMATIKA in Russian No 4, Jul-Aug 93 pp 13-22

[Article by D. V. Lebedev, Ukrainian Academy of Sciences Cybernetics Institute; UDC 629.7.05]

[Abstract] The Problem of Error Accumulation in dynamic systems because of the effect of Internal Parametric Perturbations is examined in this article. The obtained estimates of the accumulated perturbations are used for determining the frequency of attracting the sources of "extraneous" information about the system motion in order to reduce its sensitivity to the parameter variations. The capacities of the proposed approach are illustrated by an example of estimating the correction periodicity of an platformles inertial navigational system located on an aircraft flying along a great-circle-track. The aircraft dynamics are described and the equations of a platformlessinertial navigation system are derived. The sensitivity functions were computed by the statistical testing method. Their mathematical expectation as a function of the correction periodicity and the rms deviations from these values are provided in tables. Tables 2, references 6 Russian

Nonlinear Surface Acoustic Waves in the GaAs - AlAs Superlattices

947K0001D St Petersburg FIZIKA I TEKHNIKA POLUPROVODNIKOV in Russian Vol 27, No 5, May 93 pp 832-834

[Article by G. T. Adamashvili, M. D. Peykrishvili, D. D. Bitadze, Tbilisi State University, Tbilisi, Georgia]

[Abstract] The possibility of formation of SAW breezers in the GaAs-AlAs superlattices, caused by non-harmonic oscillations of the crystal lattice and by dispersion is examined. Since the phenomenon of acoustic magnetic resonance occurs in GaAs in the presence of paramagnetic impurity Fe^{2+}, the possibility of realization of acoustic self-induced transparency (ASIT) and formation of solitons as well as breezers is also examined. Numerical computations demonstrated that with non-harmonic oscillations of the lattice and dispersion, the excitation of the breezers can not occur. By replacing the Ga atoms in the GaAs by atoms of paramagnetic impurity Fe^{2+}, the conditions of the ASIT effect can be realized if the system is placed in an external permanent magnetic field. Figure 1, references 10: 6 Russian, 4 Western

Luminescence of Polaritons Near the Surface in Gallium Arsenide

947K0001B St Petersburg FIZIKA I TEKHNIKA POLUPROVODNIKOV in Russian Vol 27, No 5, May 93 pp 815-821

[Article by S. I. Boyko, I. S. Gorban, A. P. Krokhmal, V. I. Osinskiy, I. A. Rozhko, Kiev State University]

[Abstract] The photoluminescence spectra and n-1 exiton reflection of i-n^--, i-n^--n- and i- n^--n-n^+-GaAs epitaxial structures, grown by the MOS-hydride method were examined at helium temperatures. Their electron mode of conductivity was achieved by Si doping. On some epitaxial layers with many structural surface defects, such as micro-pockets, micro-cracks, oval defects, etc., the intrinsic photoluminescence was manifested in a form of intensive single band at 1.51514 eV. It was demonstrated that with attenuation $G < G_{cr}$ this band is caused by the polariton luminescence near the surface, and with $G > G_{cr}$ by the resonant luminescence of the n-1 exiton. Figures 4, references 26: 12 Russian, 14 Western

Diagnostics of Gallium Arsenide Films Grown by the Atomic-Layer Epitaxy Method

947K0001C St Petersburg FIZIKA I TEKHNIKA POLUPROVODNIKOV in Russian Vol 27, No 5, May 93 pp 822-826

[Article by T. I. Kolchenko, V. T. Koyava, V. M. Lomako, Belorus State University Scientific Research Institute of Applied Physical Problems, Minsk, Belorus]

[Abstract] The quality of GaAs layers grown by the atomic-layer epitaxy method from a gas phase of metal-organic compounds at different substrate temperatures (435-600°C) was analyzed based on measurements of Raman light scattering, low-temperature (4.5 K) photoluminescence, Hall coefficient and electroconductivity. It was determined that because of the presence of carbon acceptors, the examined layers exhibit hole conductivity. As the precipitation temperature is increased, a gradual improvement is observed of the layers' quality, accompanied by a lower concentration of holes and their increased mobility. The high degree of purity and the film quality, grown at T=600°C, is confirmed by the results of the analysis of the photoluminescence exiton band spectrum. A comparison was also made of the layers' characteristic obtained with GaAs and Ge substrates in a single technological process. It was demonstrated that the properties of the GaAs/Ge layers significantly differ from the properties of the homo-epitaxial layers. Figures 5, references 11: 1 Russian, 10 Western

Current-Voltage Characteristics of Resonant-Tunnel Diodes Based on GaAs/AlAs Heterostructures

947K0001A St. Petersburg FIZIKA I TEKHNIKA POLUPROVODNIKOV in Russian Vol 27, No 5, May 93 pp 769-774

[Article by A. S. Ignatyev, A. V. Kamenev, V. B. Kopylov, G. Z. Nemtsev, D. V. Posvyanskiy, RAS Institute of Radioengineering and Electronics, Moscow, Russia]

[Abstract] Resonant-tunnel diodes (RTD) based on GaAs/AlAs heterostructures were produced using the method of molecular-beam epitaxy, and their static volt-ampere characteristics were examined. A two-barrier structure (TBS) with a 14 nm thick non- doped GaAs layer as a spacer was grown on a 1.5 μm thick n^+-GaAs (doped by Si) with a 3×10^{18} cm^{-3} concentration of impurity. 2.5 nm thick AlAs layers were grown as TBS barriers. A 4.5 nm GaAs layer was used to form the TBS potential well. The difference in optimal temperatures of growing GaAs and AlAs constitutes the particular feature of growing this structure. Because of this feature, the temperature of the substrate was varied during the growing process. The TBS was grown at the substrate temperature of 690°C, and the GaAs layers at the temperature of 620°C. Differences were detected in the volt-ampere characteristics of the RTD produced on identical heteroepitaxial structures. An equivalent RTD model is proposed. The volt-ampere characteristics of the RTD were computed within the framework of this model for different conditions. Figures 5, references 7: 1 Russian, 6 Western

Effect of Neutron Irradiation on the Displacement of p-n Junction Boundary in GaAsP Light-Emitting Diodes

947K0001E St Petersburg FIZIKA I TEKHNIKA POLUPROVODNIKOV in Russian Vol 27, No 5, May 93 pp 838-840

[Article by I. A. Sukach, Ukrainian Academy of Sciences Institute of Semiconductors, Kiev, Ukraine]

[Abstract] The effects are examined of neutron irradiation on changes of the distribution profile of zinc atoms in gallium lattice points (Zn_{Ga}), previously generated by

thermal diffusion. Thus, this work deals with establishing the relationship between the irradiation dose F and the boundary shift of previously generated p-n-junction. Light emitting diodes (LED) based on $GaAs_{1-x}P_x$ (x=0.37 - 0.41), obtained by zinc diffusion were examined. Depth of the p-n- junction in the initial LED was W_0= 2.5+/-0.5μm. Control of changes in the position of the p-n-junction with irradiation (F = 10^{10} - $5x10^{13}$ cm^{-2}) was performed by analyzing dC/dV- characteristics. Changes in the zinc distribution profile and expansion of the compensated region with increased F were recorded, indicating that the p-n-junction boundary is shifting into the n-region. Curves were obtained showing the relationship between the value of the p-n-junction boundary shift as a function of F. Figures 2, references 7 Russian.

The Mechanism of Radiation-Induced Changes in the Maximum Position of "Impurity" Luminescence Bands in GaAs and InP

947K0001F St Petersburg FIZIKA I TEKHNIKA POLUPROVODNIKOV in Russian Vol 27, No 5, May 93 pp 841-845

[Article by Ye. V. Vinnik, K. D. Glinchuk, V. I. Guroshev, A. V. Prokhorovich, Ukrainian Academy of Sciences Institute of Semiconductors, Kiev, Ukraine]

[Abstract] Based on studies of the effects of irradiation by fast neutrons on photoluminescence of p-GaAs(Zn), it is demonstrated that in addition to the familiar mechanisms there are other, that can cause changes in the maximum position of the bands of impurity luminescence $h\nu_m$. In many situations changes in the value of $h\nu_m$ with irradiation can also be caused by the dependence of the $h\nu_m$ on the excitation intensity of the photoluminescence L, i.e. on the concentration of excess minority current carriers. The concentration is significantly reduced with increased irradiation dose Φ, resulting in a shift of the position of maximum luminescence $h\nu_m$ with irradiation, and appearance of a dose dependence $h\nu_m(\Phi)$, if $h\nu_m=\varphi(L)$. Graphs were obtained of the maximum position of impurity radiation $h\nu_m$ as a function of the irradiation dose by fast neutrons Φ, measured in p-GaAs(Zn) for various excitation intensity L and concentrations of excess electrons δn. The graphs indicate that in the irradiated crystals, the luminescence maximum $h\nu_m$ is shifted into the low-energy region, if measurements are made at large L. However, the maximum does not change its position if the measurements are made either at small L, of under conditions δn=const. Figures 2, references 12: 7 Russian, 5 Western.

The Numerical Modeling of Polysilicon Thin-Layer n-p-n and p- n-p Transistor Structures with Identical Profiles of Doping and Topology

947K0006A Kiev IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: RADIOELEKTRONIKA in Russian No 7, Jul pp 31-38

[Article by A. N. Bubennikov, A. Ye. Kargashin, Moscow Institute of Cybernetic Problems; UDC 621.382]

[Abstract] Numerical physico-technological studies of complimentary polysilicon transistor structures (TS) with identical, nearly optimal profiles of impurity distribution and identical technologies were performed at T=300 K, taking into account the temperature-concentration relationships of mobilities of major and minor carriers in these structures. The complete distribution profiles, identical for n-p-n and p-n-p transistor structures with arsenite (As) emitter and collector and boron (B) base for the former, and also with B-emitter and collector and boron base for the latter are shown in graphs. Static and quasi- static parameters of complimentary TS with identical profiles of impurity distribution and topology with the emitter surface S_E=1$μm^2$, were examined applying identical physico-topological (PT) models. The rate of effective surface recombination at the emitter contacts n-p-n and p-n-p of the TS was S_p= $1.2x10^5$ cm/sec at annealing temperature T < 900° C. Graphs are also provided showing the results of PT modeling the current-volt characteristic I_K, I_B= $f(U_{EB})$ of complementary TS, the current transfer ratio as a function of the collector current B=$f(I_K)$, and the emitter capacitance as a function of the collector current C_{TE}=$f(I_K)$. Figures 4, references 7: 3 Russian, 4 Western.

Solution of Linear Systems by Application of Rectangular Grids of Non-Planar VLSIC Elements for Modeling

947K0006B Kiev IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: RADIOELEKTRONIKA in Russian No 7, Jul 93 pp 42-47

[Article by S. S. Belyavskiy, S. G. Mulyarchik, A. V. Popov, Belorussian State University; UDC 621.382.82.001]

[Abstract] Two algorithms are proposed for automatically selecting subsets of A-conjugated vectors having a simple configuration for a system of linear algebraic equations (SLAE) with a symmetric positively determined matrix. New computation methods of conjugated gradients are developed based on these algorithms. A numerical study was carried out of the developed methods for a two-dimensional modeling problem of an insulating metal-oxide-semiconductor structure with oxide in the shape of a "bird beak", containing non-planar boundaries. With these methods, the modeling time can be reduced by a factor of two. Figures 3, references 8: 5 Russian. 3 Western

Control Device for Superfast VHF In Formation Processing Systems

947K0019 Moscow AVTOMATIZATSIYA I SOVREMENNYYE TEKHNOLOGII in Russian No 8, Aug 93 pp 22-35

[Article by Ye. I. Nefedov, A. R Tagalayev; UDC 621.372.85]

[Abstract] Emphasis is placed on the development of a higher quality of information processing based on existing domestic hardware. In this case, a VHF or UHF radio signal is used for processing in systems with t hree-dimensional integrated circuits. The use of three-dimensional circuits decreases size by 1-3 orders of magnitude and incre ases speed by 1-2 orders of magnitude. The system consists of control devices, phase shifters, attenuators, and various types of transmission lines. New and improved wideband UHF and VHF control devices are needed to foster development of these systems. An application program package has been developed to design control devices. Methods of increasing the bandwidth of the system are discussed. Various types of control devices are described. Equations are derived which may be used to analyze the charact eristics of the devices. Various types of trnasmission line junctions are discussed. Equations are presetned which can be used to evaluate the amplitude-frequency characteristic and phase-frequency characteristic of various types of junctions. Synthesis of circuit junctions is addressed. Figures show various junction topologies. Figures 12; tables 2; references 10: Russian.

Asymptotically Efficient Algorithm for Adaptive Control of Multidimensional Linear Plant

947K0017A Moscow AVTOMATIKA I TELEMEKHANIKA in Russian No 7, Jul 93 pp 95-109

[Article by A. V. Nazin; UDC62-506.1]

[Abstract]An algorithm is examined for adaptive control of a multidimensional linear stochastic plant. This algorithm is based on the usage of recurrent estimates of stochastic approximations with weighted averaging. Of primary interest was the speed with which the quality criterion converges with the optimal operating mode for a closed system. It is shown that the usage of a stochastic approximation algorithm with weighted averaging allows the maximum possible convergence speed to be achieved, if the necessary a priori information is available. The objective of control is to minimize threshold values of the output signal second moment, which is time averaged. The asymptotic properties in the sequence of estimates and average losses are researched. Conditions are established for asymptotic efficiency of the control algorithm. 29 references.

Algorithmic Control of Kalman Filter

947K0017B Moscow AVTOMATIKA I TELEMEKHANIKA in Russian No 7, Jul 93 pp 173-185

[Article by A. A. Golovan, L. A. Mironovskiy; UDC 681.326.74]

[Abstract]A functional diagnosis of a Kalman filtration algorithm is examined. Kalman filtration is carried out in an on- board digital computer which is subjected to upsets and failures. Upsets, failures and interference when information is transferred can cause the computer to produce incorrect results. Among the several possible control and diagnostics methods, the method chosen is based on analytical redundancy, which is algorithmic in nature. To test this method, the dimensions of the filter are increased by one unit of measure in order to establish the control. This allowed the whole range of control relations to be obtained, including algebraic invariants which are used to locate and localize defects. This methods occupies relatively few resources of the computer and makes it possible to discover failures and mistakes in the operation of the digital computer as they occur, which allows distorted results to be blocked, as well as prohibits mistakes from multiplying. 2 tables and 16 references.

Optical Memory Devices Based on Re-Tunable Semiconductor Lasers

937K0271B Moscow RADIOTEKHNIKA in Russian No 2-3, Feb-March 93 pp 78-82

[Article by A.A. Zhmud; UDC 681.316.56:538.61(088.8)]

[Abstract] A feasibility of constructing different types of optical memory devices based on interference systems of spatial light scanning with wavelength re-tunable semiconductor injection lasers is examined and an analysis is made of their characteristics. Functioning of these devices is based on the effect of changes in the spatial structure of the interference picture at the output of a multiple-beam Fizo interferometer (FI) with changes in the wavelength of laser which illuminates the interferometer. Optical memory devices with one Fizo interferometer and two crossed FI in the scanning system are discussed. A block diagram of a simple optical memory device with a multiple-beam FI in the scanning system is provided. Problems of constructing memory devices with a super-large capacity are also examined. Figures 4, references 8 Russian.

A Digital Optoelectronic Processor of Multi-Level Images

937K0270A Kiev ELEKTRONNOYE MODELIROVANIYE in Russian No 3, March 93 pp 13-18

[Article by V. G. Krasilenko, T. B. Martynyuk, N. I. Zabolotnaya, V. N. Dubchak; UDC 681.325.2+681.327.68:778.38]

[Abstract] A feasibility of developing a digital optoelectronic processor of multi-level images employing an algebraic addition of sign changing matrices is examined. This study is based on a stack coding concept. With stack coding the number is being coded by a stack in K plane image matrices, while the least significant bit is fixed in the first matrix, the next significant bit in the second matrix, etc. Thus, all the initial numbers, as well

as the results of processing can be represented by K digits, i.e. by K representations with dimensions NxM, each containing digit shears NxM of binary numbers. A space-continuous arithmetic-logic device is developed for synthesis of algebraic additions of sign-changing matrices. The multi-input arithmetic- logic device for processing binary images is a fundamental operating unit for expanding the functional capacity and speed of processing. Figures 3, references 14: 13 Russian, 1 Western

Asymptotics of Low Eigenvalues and Functions of the Shroedinger Operato

937K0270A Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 328, No 6 Feb 93 pp 649-653

[Article by V. N. Kolokoltsev; UDC 517]

[Abstract] Multiplicative exponential asymptotics of the splitting value in any order of a small parameter h is computed for the Shroedinger operator. A general case of several symmetrical point-wells, and wells organized in nondegenerated manifolds is also examined along with the multiplicative asymptotics of the lower eigenfunctions. First, a case of two potential wells is examined and three theorems are derived. Employing the Wentzel/Kramers/Brillouin method, equations can be obtained for a general situation, when the potential V is invariant under the impact of a finite group of orthogonal transformations and when there is a nondegenerated potential minimum in each fundamental region. References 15: 8 Russian, 7 Western

Analysis of the Switching Mode of a Quantum Electron Flow in L- and T-Structures

947K0031A Kiev AVTOMATIKA in Russian No 4, Jul-Aug 93 pp 86-90

[Article by O. Yu. Golovko, Yu. A. Klimenko, O. A. Khorozov, Ukrainian Academy of Sciences Cybernetics Institute; UDC 681.513:530.145]

[Abstract] The modes of a full reflection and transmission of electron flow using a quantum conductor with a perpendicular stub were previously examined by other authors. Their idea is based on the feasibility of changing the effective length of the stub by applying an external controlling potential. In the present work, similar modes of controlling the electron flow when it is transmitted through a T- structure and a right angle with a stub, are examined here for the first time. It is demonstrated that optimally selected quantum stubs improve the electron flow transmission. In particular, a quantum transport through a rectangle with two stubs exhibits a full transmission mode, whereas a regular rectangle exhibits no such modes. Unlike in the other work, which was initially oriented on a computer experiment, a numerical computation of the problem is carried out after conducting the corresponding analytical transformations. Relationships were developed demonstrating the advantages of the examined structures as functional elements in the nano- electronics. At the same time, a rectangle with the stub-length equal to the width of the channel is a very convenient element for rotating the quantum flow at a right angle. Figures 3, references 5 Western.

Radio-Tomograph for Medical Applications

947K0008A Kiev IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENIY: RADIOELEKTRONIKA in Russian No 8, Aug 93 pp 3-11

[Article by Ye. N. Voronin, Moscow Aviation Institute; UDC 621.3/535.2]

[Abstract] A medical radio-tomograph is proposed. The tomograph is designed for active selective diagnostics in conjunction with frequent therapy of internal organs in the millimeter to decimeter wave range. Its functioning is based on combining the principles of selective holography with adaptive location. The methodology of microwave nonlinear tomography, based on methods of contrasting substances, a priory radio- testing and adaptive self-focusing of radio-illumination is described. A diagram of the radio-tomograph is provided and the algorithm of its functioning is also described. Implementation of the proposed scientific principles and engineering solutions would improve the spacial resolution, the contrast range and the information content of radiohologrames; expand the spectrum of applications (biomedical diagnostics, selective analysis and thermal processing, non-invasive defectoscopy etc); and increase the diagnostic and therapeutic capacities of the radiotomograph (additional diagnostic information, focused treatment or heating of the internal organs, etc). Figure 1, references 14: Russian.

Spectrum Transformation in Amplifiers With a Complex Nonlinearity

937K0272A Moscow RADIOTEKHNIKA in Russian No 2-3, Feb-Mar 93 pp 15-18

[Article by E. S. Zabalkanskiy, M. Ye. Levin; UDC 621.375]

[Abstract] A method is proposed for studying nonlinear distortions in a circuit with complex nonlinearity. This method involves a transformation analysis of the spectrum of complex envelope of analytical signals on the complex equivalent characteristic of instantaneous values representing the nonlinearity. An algorithm for the spectrum transformation on a nonlinear element with specified amplitude and phase-amplitude characteristics and a program for its execution was developed.The algorithm includes the following operations: computation of the amplitude characteristics of the "real" A_c and"imaginary" A_s signal transmission channels from specified amplitude and phase-amplitude characteristic; approximation of the A_c and $A_s$characteristic by odd exponential polynomials, etc. References: 9 Russian

AVIATION AND SPACE TECHNOLOGY

Acoustic Diagnostic Methods in New-Generation Aerospace Equipment Development

947F0031A Moscow VESTNIK MASHINOSTROYENIYA in Russian No 10, Oct 93 pp 3-5

[Article by A.G. Bratukhin, O.M. Gradov, Scientific Research Institute of Nondestructive Testing; UDC 629.735:620.179.16]

[Abstract] The emergence of new-generation aerospace equipment, e.g., super- and hypersonic aircraft, space shuttles, cryoplanes, etc., calls for developing new materials and their manufacturing and processing technologies as well as methods of identifying the flying vehicle status during operation. The problem of developing new methods of nondestructive testing of welds is especially acute in aerospace engineering. Acoustic testing based on the integral link between the metal structure and its mechanical and acoustic characteristics is one of the most promising methods whereby the material structure fully determines its physical and mechanical properties, such as ductility, strength, thermal conductivity, etc., while also determining the characteristic features of elastic vibration generation and propagation, i.e, the propagation velocity, damping factor, acoustic emission intensity and its spectral composition and phase correlations, etc. In particular, attention is focused on ultrasonic and acoustic emission methods and their advantages. A block diagram of the general acoustic testing principle and a block diagram of a new-generation acoustic diagnostic complex are cited, and the acoustic data processing methods are described. Such a real-time computer-based system may be placed on-board an aircraft but it may be more efficient as a means of incoming and final inspection. A plan for further development of acoustic diagnostic methods is outlined. Figures 4; references 1.

Analysis of Cryogenic Fuel Heat Exchangers-Gasifiers in Aircraft Gas Turbine Engines

947F0035A Moscow VESTNIK MOSKOVSKOGO GOSUDARSTVENNOGO TEKHNICHESKOGO UNIVERSITETA: SERIYA MASHINOSTROYENIYE in Russian No 3(12), Jul-Sep 93 pp 45-52

[Article by A.N. Antonov, V.Yu. Prikhodin, S.V. Chivanov, Yu.P. Kozmin, V.A. Shishkov; UDC 536.24:66.045.1]

[Abstract] The increasing stringency of the requirements imposed on the economic and environmental indicators of aircraft gas turbine engines (AGTD) brought to the forefront the issue of using liquefied hydrogen or natural gas as motor fuel which calls for preliminary fuel gasification in a special heat exchanger. The development of such heat exchangers-gasifiers is fraught with a number of problems, e.g., selecting the heat exchanger location, ensuring a stable cryogenic fuel flow in the heat exchanger channels, selecting the fuel preheating regime, etc. The solution to these problems is complicated by a lack of reliable design methods. To bridge this gap, an attempt is made to develop an analysis technique using the example of heat exchanger-gasifiers for NK-88 and NK-89 engines. The design of the heat exchanger and heat and mass transfer processes during cryogenic fuel gasification are described in detail, a mathematical model of the process is formulated, and an algorithm for solving the resulting equations is proposed. The analytical method of designing heat exchangers for cryogenic fuel gasification with two-phase flow conditions inside the pipes and frosting on the outside surface is verified experimentally. The maximum spread between the analytical and experimental data is within 15-25% which attests to the mathematical model's adequacy for practical applications. Figures 4; tables 1; references 7: 6 Russian, 1 Western.

Mass Characteristics Optimization of Hydrogen Hydride Spacecraft Refrigerator

947F0035B Moscow VESTNIK MOSKOVSKOGO GOSUDARSTVENNOGO TEKHNICHESKOGO UNIVERSITETA: SERIYA MASHINOSTROYENIYE in Russian No 3(12), Jul-Sep 93 pp 53-58

[Article by N.A. Lavrov; UDC 621.592.3]

[Abstract] The promising properties of $LaNi_5$-H_x hydrides which can be ground into 5-7 μm powder with a bulk density of 3,240 kg/m^3 and a 0.55 W/m·K effective thermal conductivity, e.g., for use in hydride compressors for space-based hydrogen refrigerators where heat is supplied by the sun and removed by radiators, prompted attempts to optimize the mass characteristics of such refrigerators for subsequent use in spacecraft. Adsorption isotherms of the $LaNi_5$-H_x system, i.e., the dependence of the equilibrium hydrogen pressure on its specific mass content at various temperatures, the relationship between the heat delivery and extraction temperatures of the hydride compressor radiators, the hydrogen refrigerator *T-S*-curve, and the dependence of the total radiator area on the precooling temperature at various pressures are plotted. The total radiator area has a clearly marked precooling temperature minimum which also depends on the refrigerator's remaining parameters. Figures 5; references 7: 5 Russian, 2 Western.

Lift-to-Drag Ratio at Supersonic Velocities

947F0036A Moscow IZVESTIYA ROSSIYSKOY AKADEMII NAUK: MEKHANIKA ZHIDKOSTI I GAZA in Russian No 5, Sep-Oct 93 pp 134-141

[Article by G.I. Maykapar, Moscow; UDC 533.6.011.5]

[Abstract] The importance of estimating the attainable lift-to-drag ratio and the facilities for increasing it in order to determine the aircraft shape which ensures the

necessary lift-to-drag ratio at the design flight path section prompted an analysis of lift-to-drag ratios at supersonic velocities. To this end, flows behind a diagonal (oblique) shock and rarefaction wave are considered ignoring friction loss for a wing shaped as an infinite wedge and a triangular plate with supersonic leading edges. The advantages of an oblique wing over a delta wing are employed in a symmetric wing. The study shows that the lift-to-drag ratio of an infinite oblique plate may be considerably higher than that of triangular plates with subsonic, sonic, and supersonic edges whereby a wing with characteristic side edges is the simplest swept wing but only until the velocity component behind the shock normal to the edge reaches the speed of sound. Overall, a straight wedge with lateral washers is the optimum bearing airframe shape. Analyses shows that a combination of straight wedge airframe and plate wing produce a noticeable lift-to-drag ratio gain due to a lift redistribution between them. Figures 6; tables 1; references 13: 12 Russian, 1 Western.

Delta Wing in Hypersonic Viscous Gas Flow With Intermediate Interaction Allowing for Wake Flow

947F0036B Moscow IZVESTIYA ROSSIYSKOY AKADEMII NAUK: MEKHANIKA ZHIDKOSTI I GAZA in Russian No 5, Sep-Oct 93 pp 142-149

[Article by G.N. Dudin, Moscow; UDC 533.6.011.55+532.526]

[Abstract] Hypersonic flow of a viscous gas over a plane delta wing with finite length at a null angle of attack at a given surface temperature with a symmetric wake is considered in a Cartesian system of coordinates with an origin at the delta wing vertex assuming that the characteristic Reynolds number is large yet subcritical, so that the boundary layer and wake flow is laminar, and it is further postulated that an intermediate interaction regime is realized on the principal wing section and in the wake, and that strong interaction areas form only in the wing vertex and leading edge vicinity. The boundary value problem is solved by the finite difference method. For illustration, a plane delta wing in a flow is considered allowing for the wake flow. The pressure distribution on the wing (and, for comparison, that of a delta wing with a given trailing edge pressure), the boundary layer displacement thickness distribution, the friction stress coefficient distribution in the longitudinal direction, the velocity and enthalpy distribution on the wake axis, and the pressure distribution along the wing span with an interaction parameter of $\chi_*=2$ are plotted. The findings demonstrate that the aerodynamic characteristics of the wing within a $0.5 \le \chi_* \le 3$ interaction parameter range differ from those of a wing in a flow with a given trailing edge pressure by 10-15%. Figures 6; references 14: 13 Russian, 1 Western.

Numerical Simulation of Chemically and Thermodynamically Nonequilibrium Flows at Low and Intermediate Reynolds Numbers

947F0036C Moscow IZVESTIYA ROSSIYSKOY AKADEMII NAUK: MEKHANIKA ZHIDKOSTI I GAZA in Russian No 5, Sep-Oct 93 pp 150-157

[Article by Yu.V. Glazkov, G.A. Tirskiy, V.G. Shcherbak, Moscow; UDC 533.6.011.8]

[Abstract] Steady-state supersonic flow of a viscous chemically and thermodynamically nonequilibrium gas mixture about a smooth blunt body is considered on the basis of a model of parabolized Navier-Stokes equations which are an asymptotic form of Navier-Stokes equations under specific constraints in a body axes system of coordinates. The slip, temperature shock, and catalytic atom recombination effects on the wall are taken into account in defining the boundary conditions. The effect of nonequilibrium excitation of translational and vibrational degrees of freedom on the dissociation reactions is examined. A numerical solution of Navier-Stokes equations is sought by the method of global pressure gradient iterations. For illustration, the results of numerical calculations of hypersonic flow about an axisymmetric hyperboloid which simulates a space shuttle vehicle streamline within an 85-110 km attitude range are presented. A model with different vibrational temperatures of molecular components is also considered whereby the inverse impact of chemical reactions on vibrational relaxation is taken into account. The findings are compared to the results direct statistical simulation by the Monte Carlo method for the same conditions. Figures 5; references 14: 6 Russian, 8 Western.

NUCLEAR AND NON-NUCLEAR ENERGY

Memorandum to Acting Prime Minister of Ukraine Yukhym Zvyagilskyy

Minpryrody [Ministry of Environmental Protection] of Ukraine Position Regarding Possibility of Continuing Operation of Chernobyl AES

947F0034A Kiev UKRAYINSKA GAZETA in Ukrainian No 18, 4-17 Nov 93 p

[Text] (Main theses were presented and distributed 04-09-93 at a meeting of the Interbranch Commission on Problems of Continuing Operation of the ChAES [Chernobyl AES]; the Commission had been organized on assignment of the Cabinet of Ukraine No. 15083/64 of 11-16-92).The ChAES administration substantiates the possibility and feasibility of continuing the operation of the ChAES based mainly on the following three factors:1) economic inexpediency of decommissioning the ChAES; 2) a sufficient safety level; and 3) the human factor.Therefore one must evaluate all pro and contra factors within the context of these three categories.I.

Economic Considerations. In regards to economic arguments for continuing the operation of ChAES one should note that when providing economic justification of continuing the operation the principle aspect is determining potential economic losses caused by possible heavy accidents at the ChAES.Taking into account the current economic conditions, liquidation of potential accident effects of an even substantially lower scale compared to the 1986 accident will result in disproportionately large direct economic losses. Under these circumstances it is hard even to estimate the blow to the national economy.It is worth noting that the absence of established in advance criteria of economic, organizational and technological acceptability and the risk of continuing the ChAES operation, which would provide an appropriate gauge for a skilled analysis of the factors under consideration, does not make possible an unambiguous assessment of continuing the ChAES operation.**II. Safety Level** ChAEs administration justifies sufficiency of the safety level mainly by the large number of safety improving measures taken after 1986. But in doing so the basic deficiencies of RBMK [the type of ChAES reactors] have not been eliminated, namely: **the absence** of a localization system for the upper (steam water) section of reactor pipelines; as a result, in the case of a certain accident (rupture of the PVK [expansion not given], separator drum and/or steam lines to the GZZ [expansion not given]) an indeterminate amount of radioactive heat transfer agent can be released into the environment. In addition, such accident leads to a loss of the heat transfer agent and can result in drying the fuel core with all accompanying consequences;) the reactor **vulnerability** to ruptures of technological channels (according to calculations performed by the Chief Designer the localization system was designed for rupture of not more than two to three channels, and independent experts surmise the possibility of the mechanism of a chain-like increase of the number of TK [expansion not given] ruptures after a rupture of one channel); such accident is analogous to the 1986 accident; **vulnerability** of the steel zirconium joints in technological channels to temperature fluctuations and their uncertain behavior in the case of thermal shocks (for instance, a false or prearranged operation of the SAOR [expansion not given] system); **low** quality and reliability of the equipment, especially of shutoff and control valves and the "SKALA" computing control system (the service life of the latter had been used up long ago); **the absence** of protection of safety important equipment from negative environmental factors (temperature, humidity and impact loads), which makes this equipment vulnerable in accident situations; **the absence** of physical separation of power supply cables for standby equipment of safety and safety important systems and separation of power and control cable flows; **inefficiency** of the generator room fire-fighting system and vulnerability of design solutions related to placement of safety important systems in the generator room; **a large** number if welded joints in the first loop (KMPTs [expansion not given] and the absence of state-of-the-art diagnostic systems.In addition, the insufficient current safety level is substantially affected by the following factors: **unsatisfactory** level of the safety culture, which is indicated by a large number of additional failures and defects detected during scheduled simulated accident situations; **miscalculations** of the existing system of providing corrective actions based on results of investigation of incidents and accident situations; this was noted by the IAEA expert ASSET mission based on results of investigating the circumstances of the 1991 fire of the second unit. **Human Factor**From the standpoint of social factors and the problem of employment of highly skilled personnel, continuing the operation to 1997 will not eliminate the problem in principle it will only postpone it for some time.Under these conditions and taking into account predominant safety considerations when considering the problem of stopping the CHAES operation, one should consider the availability of a large number of skilled personnel within a different context, namely, as a positive factor which can solve the problem of manning new units of AES with VVER 1000 [reactor type] if a substantiated decision is made to stop the moratorium on their commissioning.Based on the above arguments, Minpryrody considers the substantiation of the possibility of continuing the operation of the Chernobyl AES insufficient and the Supreme Soviet decision regarding decommissioning of the Chernobyl AES inexpedient.**"UKRAYINSKA GAZETA". By publishing a selection of documents related to continuing operation of the Chernobyl AES we are hoping to inform our readers about the Acting Prime Minister's response as to the position of both sides, as well as to receive a clear Minpryrody answer as to what to do with our AES and how to do it.**

Memorandum to Acting Prime Minister of Ukraine Yukhym Zvyagilskyy

Minpryrody [Ministry of Environmental Protection] of Ukraine Position Regarding Possibility of Continuing Operation of Chernobyl AES

947F0034A Kiev UKRAYINSKA GAZETA in Ukrainian No 18, 4-17 Nov 93 p 4

[Text] (Main theses were presented and distributed 04-09-93 at a meeting of the Interbranch Commission on Problems of Continuing Operation of the ChAES [Chernobyl AES]; the Commission had been organized on assignment of the Cabinet of Ukraine No. 15083/64 of 11-16-92).

The ChAES administration substantiates the possibility and feasibility of continuing the operation of the ChAES based mainly on the following three factors:

1.Economic inexpediency of decommissioning the ChAES;

2.A sufficient safety level

3.The human factor.

Therefore one must evaluate all pro and contra factors within the context of these three categories.

I. Economic Considerations.

In regards to economic arguments for continuing the operation of ChAES one should note that when providing economic justification of continuing the operation the principle aspect is determining potential economic losses caused by possible heavy accidents at the ChAES.

Taking into account the current economic conditions, liquidation of potential accident effects of an even substantially lower scale compared to the 1986 accident will result in disproportionately large direct economic losses. Under these circumstances it is hard even to estimate the blow to the national economy.

It is worth noting that the absence of established in advance criteria of economic, organizational and technological acceptability and the risk of continuing the ChAES operation, which would provide an appropriate gauge for a skilled analysis of the factors under consideration, does not make possible an unambiguous assessment of continuing the ChAES operation.

II. Safety Level

The ChAEs administration justifies sufficiency of the safety level mainly by the large number of safety improving measures taken after 1986. But in doing so the basic deficiencies of RBMK [the type of ChAES reactors] have not been eliminated, namely:

- **the absence** of a localization system for the upper (steam-water) section of reactor pipelines; as a result, in the case of a certain accident (rupture of the PVK [expansion not given], separator drum and/or steam lines to the GZZ [expansion not given]) an indeterminate amount of radioactive heat- transfer agent can be released into the environment. In addition, such accident leads to a loss of the heat-transfer agent and can result in dewatering the fuel core with all accompanying consequences;

- the reactor **vulnerability** to ruptures of technological channels (according to calculations performed by the Chief Designer the localization system was designed for rupture of not more than two to three channels, and independent experts surmise the possibility of the mechanism of a chain-like increase of the number of TK [expansion not given] ruptures after a rupture of one channel); such accident is analogous to the 1986 accident;

- **vulnerability** of the steel-zirconium joints in technological channels to temperature fluctuations and their uncertain behavior in the case of thermal shocks (for instance, a false or prearranged operation of the SAOR [expansion not given] system);

- **low** quality and reliability of the equipment, especially of shutoff and control valves and the "SKALA" computing control system (the service life of the latter had been used up long ago);

- **the absence** of protection of safety-important equipment from negative environmental factors (temperature, humidity and impact loads), which makes this equipment vulnerable in accident situations;

- **the absence** of physical separation of power supply cables for standby equipment of safety and safety-important systems and separation of power and control cable flows;

- **inefficiency** of the generator room fire-fighting system and vulnerability of design solutions related to placement of safety-important systems in the generator room;

- **a large** number if welded joints in the first loop (KMPTs [expansion not given]) and the absence of state-of-the-art diagnostic systems.

In addition, the insufficient current safety level is substantially affected by the following factors:

- **unsatisfactory** level of the safety culture, which is indicated by a large number of additional failures and defects detected during scheduled simulated accident situations;

- **miscalculations** of the existing system of providing corrective actions based on results of investigation of incidents and accident situations; this was noted by the IAEA expert ASSET mission based on results of investigating the circumstances of the 1991 fire of the second unit.

As far as the measures aimed at improving neutron-physical parameters of RBMK that were implemented in operating ChAES units are concerned, one should also note the presence of essentially negative consequences of modernization of the control and protection system (CPS), the most serious of which are: **increased** positive effect of dewatering of the CPS coolant circuit, which under certain situations of compensation with rods during reaching a critical state (the most vulnerable moment) can get as high as 5-6 eff; and it should be noted that this positive reactivity is released when draining water just within approximately two meters of the middle section of the fuel core (which is indicated by results of 1987 physical experiments in the third unit); **when operating** at nominal capacity the operational reactivity margin is mostly comprised of rods submerged into the core, so the actual operating reactivity margin is much lower than computed by "SKALA" (43-48 RR [expansion not given]); the remaining rods are mainly located in the VK [expansion not given] (except local automatic regulators). These factors are playing the principle role in reducing AZ-5 [expansion not given] effectiveness during the first second of its operation:

- reduced subcriticality margin of the reactor when stopping it and impossibility of repair modes without introducing additional absorbers into the core.

Concentrating one's attention on using up the channel-graphite clearance as the main and only factor that determines the possibility or impossibility of continuing operation of RBMK is artificial. The RBMK has a lot of other drawbacks, and a large number of those have not yet been detected and analyzed. The most significant is the regularity and sequence of dangerous RBMK accidents after 1986 (the most striking examples are an LAES [Leningrad AES] accident in March of 1992 and a complicated fire in the generator room of the second unit in October of 1991).

Thus, the problem of increasing the safety level after the modernizations leaves open the main problem: is the current RBMK safety level acceptable? From the standpoint of requirements of international safety rules and even the former Soviet Union rules the safety level of this type of reactors is unacceptable.

- III. Human Factor

From the standpoint of social factors and the problem of employment of highly skilled personnel, continuing the operation to 1997 will not eliminate the problem in principle - it will only postpone it for some time.

Under these conditions and taking into account predominant safety considerations when considering the problem of stopping the CHAES operation, one should consider the availability of a large number of skilled personnel within a different context, namely, as a positive factor which can solve the problem of manning new units of AES with VVER-1000 [reactor type] if a substantiated decision is made to stop the moratorium on their commissioning.

Based on the above arguments, Minpryrody considers the substantiation of the possibility of continuing the operation of the Chernobyl AES insufficient and the Supreme Soviet decision regarding decommissioning of the Chernobyl AES inexpedient.

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In regards to economic arguments for continuing the operation of ChAES one should note that when providing economic justification of continuing the operation the principle aspect is determining potential economic losses caused by possible heavy accidents at the ChAES.

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It is worth noting that the absence of established in advance criteria of economic, organizational and technological acceptability and the risk of continuing the ChAES operation, which would provide an appropriate gauge for a skilled analysis of the factors under consideration, does not make possible an unambiguous assessment of continuing the ChAES operation.

II. Safety Level

The ChAEs administration justifies sufficiency of the safety level mainly by the large number of safety improving measures taken after 1986. But in doing so the basic deficiencies of RBMK [the type of ChAES reactors] have not been eliminated, namely:

- **the absence** of a localization system for the upper (steam-water) section of reactor pipelines; as a result, in the case of a certain accident (rupture of the PVK [expansion not given], separator drum and/or steam lines to the GZZ [expansion not given]) an indeterminate amount of radioactive heat- transfer agent can be released into the environment. In addition, such accident leads to a loss of the heat-transfer agent and can result in dewatering the fuel core with all accompanying consequences;

the reactor **vulnerability** to ruptures of technological channels (according to calculations performed by the Chief Designer the localization system was designed for

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vulnerability of the steel-zirconium joints in technological channels to temperature fluctuations and their uncertain behavior in the case of thermal shocks (for instance, a false or prearranged operation of the SAOR [expansion not given] system);

low quality and reliability of the equipment, especially of shutoff and control valves and the "SKALA" computing control system (the service life of the latter had been used up long ago);

- **the absence** of protection of safety-important equipment from negative environmental factors (temperature, humidity and impact loads), which makes this equipment vulnerable in accident situations;

- **the absence** of physical separation of power supply cables for standby equipment of safety and safety-important systems and separation of power and control cable flows;

- **inefficiency** of the generator room fire-fighting system and vulnerability of design solutions related to placement of safety-important systems in the generator room;

a large number if welded joints in the first loop (KMPTs [expansion not given]) and the absence of state-of-the-art diagnostic systems.

In addition, the insufficient current safety level is substantially affected by the following factors:

unsatisfactory level of the safety culture, which is indicated by a large number of additional failures and defects detected during scheduled simulated accident situations;

miscalculations of the existing system of providing corrective actions based on results of investigation of incidents and accident situations; this was noted by the IAEA expert ASSET mission based on results of investigating the circumstances of the 1991 fire of the second unit.

As far as the measures aimed at improving neutron-physical parameters of RBMK that were implemented in operating ChAES units are concerned, one should also note the presence of essentially negative consequences of modernization of the control and protection system (CPS), the most serious of which are:

increased positive effect of dewatering of the CPS coolant circuit, which under certain situations of compensation with rods during reaching a critical state (the most vulnerable moment) can get as high as 5-6 eff; and it should be noted that this positive reactivity is released when draining water just within approximately two meters of the middle section of the fuel core (which is indicated by results of 1987 physical experiments in the third unit);

when operating at nominal capacity the operational reactivity margin is mostly comprised of rods submerged into the core, so the actual operating reactivity margin is much lower than computed by "SKALA" (43-48 RR [expansion not given]); the remaining rods are mainly located in the VK [expansion not given] (except local automatic regulators). These factors are playing the principle role in reducing AZ-5 [expansion not given] effectiveness during the first second of its operation:

- **reduced** subcriticality margin of the reactor when stopping it and impossibility of repair modes without introducing additional absorbers into the core.

Concentrating one's attention on using up the channel-graphite clearance as the main and only factor that determines the possibility or impossibility of continuing operation of RBMK is artificial. The RBMK has a lot of other drawbacks, and a large number of those have not yet been detected and analyzed. The most significant is the regularity and sequence of dangerous RBMK accidents after 1986 (the most striking examples are an LAES [Leningrad AES] accident in March of 1992 and a complicated fire in the generator room of the second unit in October of 1991).

Thus, the problem of increasing the safety level after the modernizations leaves open the main problem: is the current RBMK safety level acceptable? From the standpoint of requirements of international safety rules and even the former Soviet Union rules the safety level of this type of reactors is unacceptable.

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Economic Considerations.** In regards to economic arguments for continuing the operation of ChAES one should note that when providing economic justification of continuing the operation the principle aspect is determining potential economic losses caused by possible heavy accidents at the ChAES.Taking into account the current economic conditions, liquidation of potential accident effects of an even substantially lower scale compared to the 1986 accident will result in disproportionately large direct economic losses. Under these circumstances it is hard even to estimate the blow to the national economy.It is worth noting that the absence of established in advance criteria of economic, organizational and technological acceptability and the risk of continuing the ChAES operation, which would provide an appropriate gauge for a skilled analysis of the factors under consideration, does not make possible an unambiguous assessment of continuing the ChAES operation. **II. 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Relationship of Planet's Electromechanics to Global Processes in Ocean

947F0049A Moscow IZVESTIYA ROSSIYSKOY AKADEMII NAUK: ENERGETIKA in Russian No 6, Nov-Dec 93 pp 37-43

[Article by I.P. Kopylov, Moscow]

[Abstract] The search for new sources of electric power prompted an attempt to consider the power of the ocean—the principal store of energy on the planet—from the viewpoint of general electromechanics. The approach to developing commercial power plants for generating large quantities of electric power necessitated an examination (qualitative, at first) of the ocean power from the viewpoint of electromechanical energy conversion. To this end, the planet Earth is considered as an electrical machine whose magnetic field is created by a longitudinal current on the boundary of the solid core and liquid magma as well as radiation belts in space. The design of a unipolar electric motor is cited, and the planet Earth-electric machine is simulated by a machine which combines a magnetohydrodynamic (MGD) generator with an MHD motor in a single electromechanical system. It is assumed that the Earth rests on space just like electric machines working in parallel with a network of infinite power in engineering electromechanics. The sine-shaped curve of transverse current on the planar Earth projection is plotted, and it is noted that the sinusoidal curve coincides with the great oceanic currents, i.e., the Gulfstream and the Great Pacific Current. The effect of retardation of the Earth's spinning speed is taken into account. The high probability of a global change in the geomagnetic field and its consequences call for setting up state programs aimed at addressing the resulting global issues. The conclusion is drawn that electromechanical energy conversion has a certain role to play in our planet's evolution and that electromechanical energy's fraction of the total energy balance of the planet is on the same order of magnitude as thermal energy. Figures 4; references 9.

INDUSTRIAL ENGINEERING

On Use of Laser Radiation for Shaped Cutting of Rolled Bituminous Materials

947F0048A Moscow STROITELNYYE MATERIALY in Russian No 8(464), Aug 93 pp 25-26

[Article by L.A. Teplova, Scientific Production Association of Polymer Building Materials; UDC 678.58.691.16.621.791.94]

[Abstract] The widening gap between the physical and engineering base of the construction industry and today's standards, the low mechanization level of roofing operations, and the increasing popularity of soft bitumen-based materials prompted the National Scientific Research Institute of Polymer Building Materials together with the Tekhnopom National Scientific and Engineering Center to examine the effectiveness of shaped cutting of rolled bitumen-impregnated roofing materials using a specialized laser system. To this end, CW, pulse, and periodic pulse CO_2, garnet, ruby, and Nd-glass lasers are tested. The experiment demonstrates that CO_2 CW lasers with a 1-6 kgf/cm^2 air injection to the cutting zone are optimum for materials moving at a high velocity relative to the beam. A comparison of laser, mechanical, and combined laser-mechanical cutting methods and process parameters makes it possible to speculate that a 36.9 m/min cutting speed can be obtained using a 5 kW laser whose radiation is split into two beams. The advantages of a computer-aided laser cutting system include the simplicity and speed of switching from one standard size of material to another. The findings confirm the outlook for using laser radiation for shaped cutting of soft bitumen-impregnated roofing materials and the method's ability to implement complex designer concepts and original shapes for various building roof shapes. The anticipated economic impact from implementing the computer-aided laser complex using the combined laser-mechanical method with a double-split beam and three knives is up to 10 million rubles in 1993 prices. References 4.

Measurement of the Total Content and Altitude Distribution of Ozone From the Meteor-3 Satellite

947N0022 Moscow IZVESTIYA AKADEMII NAUK FIZIKA ATMOSFERY I OKEANA in Russian Vol 29 No 5, Sep-Oct 93 pp 646-652

[Article by O. A. Volkovitskiy, A. V. Kalsin, T. V. Kozina, V. T. Milchenko, N. V. Tereb, N. M. Troyanova, Tayfun Scientific Production Association; UDC 551.510.41]

[Abstract] Preliminary results of measurement of the total content and altitude concentration distribution of ozone are presented. Measurements were made from the Meteor-3 satellite with a BUFS-2 ultraviolet spectrometer. The information processing method is outlined, and simultaneous results obtained from the US TOMS ozone meter on the Meteor-3 are presented. The BUFS-2 instrument is a diffraction spectrometer with double monochromatization (dispersion subtraction) of the incident radiation. There are twelve spectral channels in the 255-340 nm range, with one channel at 388 nm in continuous operation. Ratios of atmospheric albedo are measured at a pair of wavelengths and compared with previously calculated values of these ratios for various ozone content figures. A figure contrasts ozone content findings from the BUFS-2 and the TOMS instruments for various latitudes. The Antarctic ozone hole is evident. Figures give the ozone concentration altitude distribution for Antarctica, the tropics, the middle latitudes, and the small ozone hole at 38.9N 111.5W formed by intrusion of a tropical air mass at the middle latitudes. Experimental data are contrasted with model data. The derivation of the model is described. Figures 3; table 1; references 16: 9 Russian, 7 Western.

Comparison of Model Profiles of Stratosphere Trace Species and Observational Data

947N0013 Moscow ASTRONOMICHESKIY VESTNIK in Russian Vol 27 No 5, Sep-Oct 93 pp 43-52

[Article by O. P. Krasitskiy, M. Ya. Marov, Keldysh Institute of Applied Mathematics; UDC 523.31-852]

[Abstract] The model used in this study covers altitudes from 0 to 60 km and considers chemical and photochemical processes involving O, H, C, N, and Cl. The temperature and density used in the model are representative of March at 45°N. The model is one-dimensional and yields global average daily vertical profiles of atmospheric components. There is a satisfactory agreement between the theoretical models and observational data in most cases; however, there are substantial divergences in the concentrations of several components at various altitudes. For example, the models used here yielded excessive amounts of NHO_3, much less H_2O, and at higher altitudes, noticeably less CH_4 and H_2. This may be due to problems with the chemical scheme of the model due to a poor description of vertical transfer, as well as incorrect treatment of turbulent mixing. Further study is required to identify physical and chemical processes responsible for these divergences. Models and observational data can be more accurately compared by using two-dimensional and three-dimensional models. Individuals ections of the article discuss active and inert components, HNO_3 and O_3. Figures 22; references 8: 2 Russian, 6 Western.

Simulation of Rising of Gas-Dust Cloud Forming During Impact of Asteroids and Comets

947N0007A Moscow DOKLADY AKADEMII NAUK in Russian Vol 332 No 1, Sep 93 pp 85-88

[Article by V. V. Adushkin, V. V. Garnov, I. I. Divnov, I. V. Nemchinov and B. D. Khristoforov, Dynamics of Geospheres Institute, Russian Academy of Sciences, Moscow; UDC 550.348.098]

[Abstract] A study was made to determine the minimum energy of a space body impacting on the Earth's surface with which the developing cloud breaks through the tropopause and enters the upper atmosphere. The possible consequences of impacts of bodies with a diameter from 100 m to 1 km is examined; the altitude of rising of the cloud is estimated for an impact with an energy 10-30 megatons. The physical picture of the resulting effects is discussed in detail. With the impact of meteor bodies with an energy in the indicated range a break is formed in the tropopause and dust surges into the upper layers of the atmosphere. With an increase in the mass of the impacting body, and accordingly, an increase in the energy of the explosion by two or three orders of magnitude, there is a change in the very character of rising of the dust cloud because instead of a turbulent cloud rising relatively slowly under the influence of Archimedes force a high-velocity plasma of the space body and ground (with the mass of the latter being greater than that of the space body itself) escapes into the upper layers of the atmosphere. The atmospheric dust content will be determined to a considerable degree by condensation processes. Only in the late stages will there be a slower ejection of melt and finely dispersed dust to lesser altitudes, but nevertheless above the tropopause. Additional atmospheric pollution will occur due to the great fires arising under the influence of thermal radiation. Figures 4; references 15: 1 Russian, 14 Western.

Evaluating the Possibility of Determining the Location and Configuration of a Cloud of Harmful Atmospheric Emissions by Industrial Plants Using Radar

947N0021 Moscow METEOROLOGIYA I GIDROLOGIYA in Russian No 12, Dec 93 pp 94-100

[Article by G. P. Zhukov, B. S. Yurchak, Tayfun Scientific Production Association; UDC 551.501.89:551.510.42]

[Abstract] Results obtained from the use of passive radar to study the physics of clouds and the diffusion of passive components in the lower part of the boundary

layer of atmosphere are the foundation for the use of carbon and graphite chaff to track planned and accidental emissions of harmful substances by industry. The cloud of harmful substances is marked with chaff with a rate of sedimentation closely matching that of the tracked substance. Several materials with different rates of sedimentation may be used to track various components of the cloud.. The chaff is to be installed in the stacks, ventilators, and other structural elements of the plant and may be released on command or automatically when the maximum permissible concentration of a substance is exceeded in the emission. Figures show how this method was used to track the vertical and horizontal position and configuration of a cloud of chaff. A similar experiment conducted in the US with aluminized mylar chaff is noted. The maximum tracking distance for various diffusion conditions is determined. Figures 3; table 1; references 21: 16 Russian, 5 Western.

Basic Factors of the Effect of Atomic Power Plants on the Environment

947N0015 St. Petersburg IZVESTIYA RUSSKOGO GEOGRAFICHESKOGO OBSHCHESTVA in Russian Vol 125 No 5, Sep-Oct 93 pp 73-77

[Article by A. V. Gusev, St. Petersburg; UDC 910.3:551.59:(621.311.22:621.039)]

[Abstract] This article discusses the intermediate climatic effects of atomic power plants on the environment. The plant used as an example is the Leningrad atomic power plant, which has a boiling-water uranium-graphite reactor. The two main factors affecting the environment are the release of radioactive materials from the stack, and the release of hot water into a natural body of water (in this case a section of the Gulf of Finland). The classification of accidents in the Russian system and the IAEA is contrasted. The Russian system has two levels of accident: one which can be handled automatically by the plant (which the plant is designed for), and the other is a catastrophic accident. The accident of the Leningrad plant on 24 March 1992 is used as an example. The table presents maximum permissible concentrations of emissions for a stack height of 100 m. The figure gives dosage versus distance data for fallout of iodine from a radioactive cloud. A formula is presented to calculate possible ground level concentrations of contaminants. Figure 1; table 1; references 8 (Russian).

Assessment of Air Pollution Using a Quantitative Model of Impurities Transfer (A Case Study of the Norilsk Mining and Metallurgic Plant)

947N0017 Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA: SERIYA 5—GEOGRAFIYA in Russian No 4, Jul-Aug 93 pp 17-20

[Article by P. N. Belov, Department of Meteorology and Climatology, Moscow State University; UDC 551.510.42]

[Abstract] This article evaluates the concentration of various harmful substances in the air using a trajectory model based on a theoretical model of impurities transfer. Concentrations of impurities were calculated at various distances from Norilsk. Relief, vegetation, snow cover, the season, and meteorological conditions were considered. Tables present concentrations of various harmful substances in Norilsk in adverse meteorological conditions during summer and winter and the maximum one-time and average daily maximum permissible concentrations of these substances and corresponding warning levels. Figure 1; tables 4; references 13 (Russian).

Technogenic Heavy Metals and Arsenic in Atmospheric Aerosols in Chimkent

947N0016 Moscow VESTNIK MOSKOVSKOGO UNIVERSITETA: SERIYA 5—GEOGRAFIYA in Russian No 3, May-Jun 93 pp 21-27

[Article by T M. Belyakova, A. V. Kornilov, Department of the Regional Geochemistry and Soil Geography, Moscow State University; UDC 502.55(203 574.53)]

[Abstract] Metals are released by virtually all of Chimkent's industries: cementmaking, refining, phosphorus processing, asbestos cement construction, thermal electric power generation, etc. The situation is worsened by the city's tendency to develop inversion layers, coupled with low winds and low precipitation levels. The distribution of metals in the lower atmosphere over Chimkent was studied by analyzing the quantity and spatial differentiation of pollution, the daily pattern and dynamics of concentrations of toxins in relation to synoptic-meteorological conditions, and by identifying the sources of pollution. The experimental method of the study is described. Lead was found to be the most hazardous pollutant, with concentrations reaching 25-50 times the maximum permissible concentration during some periods. The lead smelting plant and the coal burning thermal electric plant were found to be key sources of pollutants. Figure 1; table 1; references 6 (Russian).

AGRICULTURAL SCIENCE

New Generation of Agricultural Sprayers

947C0044A Moscow ZASHCHITA RASTENIY in Russian No 2, Feb 93 pp 22-23

[Article by Ya. K. Omelyukh, department director, GSKTB selkhozkhimmash; Ye. A Barysh, department deputy director; S. M. Dutko, head engineer; and A. I. Kolobich, department director: "Machines for Plant Protection"]

[Text] The Lvovkhimselkhozmash Production Association is a supplier of boom and blower sprayers (except for a small quantity of OPV-1200A sprayers transferred to the Tadzhikkhimselkhozmash Plant for production), fertilizer distributors and machines for disinfecting livestock buildings. Most articles are produced as unified families out of basic models and units employing a modular unit layout. However, designers are devoting increasingly greater attention to making machines all-purpose by using various interchangeable tools for surface and soil application, spray rods with hose reels, and so on, and showing concern for improving the health and hygienic conditions of the work of machine operators.

Creation of machines making it possible to raise productivity by increasing operating width and speed, and using devices capable of reducing working fluid consumption rates appears promising. The equipment will become less material- and energy-intensive, and it will be fitted out with automated systems based on electronics and microprocessor technology.

In 1991 the Lvovkhimselkhozmash Production Association produced 26,500 sprayers and fertilizer distributors; however, this amount turned out to be insufficient to completely satisfy the demand for equipment. In most cases rural laborers failed to receive enough of the machinery they needed because of shortfalls in deliveries of a number of associated parts and materials, and owing to an ill-conceived pricing policy.

Information exchange among CIS countries has weakened unfortunately. Sometimes farmers are unaware of what kind of equipment is being produced, where it could be ordered and how much it costs. Readers will be interested in our report on machines in series production at plants of this production association.

The plant can offer the following machines today:

OP-2000-2 small trailed boom sprayer;

OPSh-15 trailed boom sprayer;

OM-630-2 small mounted boom sprayer;

PZhU-2.5 liquid fertilizer distributor;

PZhU-5 liquid fertilizer distributor;

PZhU-9 liquid fertilizer distributor;

MDPF-2000 trailed disinfector;

OPV-2000 trailed blower sprayer;

POM-630 and POM-630-1 mounted fertilizer distributor-sprayer;

OP-32000 fertilizer distributor;

OP-32000-1 fertilizer distributor-sprayer.

A diversity of standard tank sizes permits sensible use of equipment in all conditions: in zones with small field maps and a pass length of up to 1 km (630 and 1,200 liter tanks); with midsized field maps and a pass length of up to 2 km (2,000 liter tank); in zones with large field maps and a pass length of up to 3 km (3,200 liter tank); with large field maps and a pass length greater that 3 km; in farms with fields located far away from the central farmstead (6,400 liter tank).

Rural laborers, including commercial farmers, will be interested in a **new family of boom-type machines for plant protection and for application of liquid mineral fertilizers. The MZU-320 and MZU-320-1 mounted machines and the MZU-1200 trailed machine** will be an aid in protecting field row and vegetable crops with liquid chemical or microbiological preparations, and they will provide for surface application of basic solutions of complete liquid fertilizers. They can also be used successfully to disinfect livestock buildings and to wash agricultural machines with the help of spray rods supplied by special order. The machines are outfitted with units for mechanized working mixture preparation, and they are equipped with a special system for flushing the tank and all lines after spraying in order to ensure maximum environmental protection.

The **MZU-3200 machine for plant protection and fertilizer application** is intended for chemical protection of serial crops cultivated by intensive procedures with a constant equipment track width (1,800 mm), and other field crops against pests, diseases and weeds under routine and small-volume spraying conditions, while its **MZU-3200-1 modification** is intended both for surface application of pesticides and complete liquid fertilizers (including with intensive procedures without a constant equipment track width), and for surface application of herbicides and their simultaneous placement with soil-working implements, and internal application of complete liquid fertilizer simultaneously with presowing soil working by cultivators. An attachment for surface application of all-purpose herbicides with their simultaneous placement in the soil by BMSh-15, BMSh-20 and BIG-3A harrows hitched to SP-16A units, used for internal application of complete liquid fertilizers, may be added to the MZU-3200-1 machine at the client's request.

Sprayers are equipped with horizontally stabilized hydraulic wide-swath booms, which guarantees high processing quality at an operating speed of up to 12 km/hr. The process itself as well as folding and raising of the boom are controlled by a hydraulic system from the

tractor cab. The height of the boom is adjustable from 0.7 to 1.8 m. Four standard sizes of slot sprayers and two of deflector sprayers make it possible to vary consumption of working fluid per hectare within a wide range. Attachments are secured by quick-release bayonet joints. A closed stream method is used to adjust the machinery for work.

Sprayers are outfitted by a separate order with an automatic control system (SAURZh) ensuring stable maintenance of a set consumption rate with a deviation of 5 percent even with change in speed. There is a device for mechanizing preparation of working mixtures, and an extra tank (320 liters) for clean water used to flush the lines.

Specialists of the GSKTB selkhozkhimmash [not further identified] are conducting scientific research and experimental design work to create machinery for a contact wetting method of applying herbicides and plant growth regulators, electrostatic sprayers, sprayers employing a pneumatic spray-forming system, aerosols with controllable drop size, and machines for separate delivery of pesticides and water. Some of the work is being done jointly with companies of the FRG.

In addition the GSKTB selkhozkhimmash is working on a contract basis to prepare equipment for pesticide-conserving plant protection procedures that produce a savings of preparations of up to 50 percent, and to introduce them into the farms of clients;

for band placement of herbicides in the cultivation of corn, sugar beets and other industrial crops by means of the OPK-8 sprayer-distributor;

for highly productive remote spraying of potatoes against the Colorado beetle and cereal crops against pests using the OPU-320 sprayer (with a working fluid consumption rate of 1-20 liters/ha);

for processing potatoes (OPSh-320, OPSh-630) against phytophthora using pneumatic booms (with a consumption rate of 20-100 liters/ha);

for treatment of small volumes of potatoes (PSK-20) prior to planting and storage (with a working fluid consumption rate of 3-8 liters/tonne);

introduction of a biological plant protection method of releasing entomophages by means of RESh-18 boom sprayers, and OShU-50 and PRE-35 blower sprayers for releasing *Trichogramma*;

sanitary and hygienic processing of livestock buildings using a cold aerosol generator.

The **ZR-2000, ZR-3200, ZR-3200-1 and MPR-3200 mixer-loaders**, which are intended for preparation of working fluids out of quickly dissolving ingredients and for loading sprayers, occupy a special place in the outfit of machines for chemical plant protection. They are fitted out with a tapered container for storage of concentrated pesticides and a system for their metered delivery. The pumping unit of ZR-2000 and ZR-2000-1 mixers is driven by an internal combustion engine (made in the USA) while that of the ZR-3200 is driven by the tractor's power takeoff shaft.

Lvov designers have developed the **OMT-100 small sprayer** for commercial farms, leasing organizations and peasant farms. This device is mounted on a T-010 tractor of the Kharkov Tractor Plant and the AZhMK-8 of the Gomselmash Plant, and it is intended for chemical protection of orchards, vineyards, and vegetable and other crops. It can be used for disinfection and disinfestation of buildings, for irrigation of small private plots, and in orchard and gardening cooperatives.

Comparison of the basic specifications of the new generation of sprayers with the best foreign analogues shows that in terms of productivity, swath, lifting capacity, working fluid consumption rates and other indicators, they correspond to world standards. However, designers still have more work to do to reduce weight and material content, to upgrade the quality of manufacture, and to improve appearance.

Designers are also troubled by the problem of raising the effectiveness of chemical plant protection measures, which depends in many ways on the proficiency of machine operators and competent operation of equipment. This is precisely why the association has organized a training center at which to upgrade the qualifications of machine operators. It has been supplied with posters describing the layout, adjustment and control of the machines. Specialists will soon be offered illustrated manuals offering recommendations on the use, technical maintenance, storage, preservation and repair of the machines. It is to be published this year.

The equipment is being sold both through the Agropromsnab [not further identified] and through direct contracts. Those wishing to acquire the machines need to sign a contract with the Lvovkhimselkhozmash Production Association or pay for the machines in advance.

For information call 34-33-81.

BIOTECHNOLOGY

State of Cell Membrane Enzymes in Hypoxia and Protective Effect of Pirazidol

937C0094A Moscow BIOKHIMIYA in Russian Vol 58 No 1, Jan 93 [manuscript submitted 22 Jan 92] pp 62-69

[Article by I. A. Goroshinskaya, L. V. Mogilnitskaya, L. A. Nemashkalova, A. A. Khodakova, Scientific Research Institute of Biology, Rostov-na-Donu State University; UDC 577.352.5]

[Abstract] A study of the effects of hypobaric hypoxia equivalent to an altitude of 9000 m and to sea level on the stability of erythrocyte, lysosome, and mitochondrial membranes was based on a number of assumptions and

previously established facts. The researchers had earlier ascertained that hypobaric hypoxia destabilizes erythrocyte membranes and results in an increase in serum levels of extraerythrocyte hemoglobin, total peroxidase activity, and glucose-6-phosphate dehydrogenase activity. Such hypoxia also changes the permeability of lysosomal membranes and the activity of lysosomal peptide hydrolases and disrupts the structures of the mitochondrial membrane and the catalytic properties of monoaminooxidase. Since the psychotropic drug pirazidol inhibits lipid peroxidation rate, the researchers hypothesized that the administration of the drug ahead of time would stabilize membranes and help to raise the body's resistance to hypoxia. In white male rats confined for three hours in an altitude chamber with an atmospheric pressure of 0.029 mPa, the administration of the pirazidol prevented a rise in the serum levels of hemoglobin, total iron, and total peroxidase activity. The overall activity of lysosomal acidic peptide hydrolases in all tissues and the free activity in the brain and liver did not differ from control, and the pulmonary activity of enzymes in soluble fraction was even 27 percent lower than in control animals. The administration of the drug also prevented any change in substrate specificity in mitochondrial fraction, as well as enzyme release to soluble fraction. References 28: 20 Russian, 8 Western.

Arenavirus Fusion Peptide Induces Single Ion Channels in Bilayer Lipid Membranes

937C0091B Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 10 No 2, Mar-Apr 93 [manuscript submitted 24 Apr 92] pp 194-203

[Article by A. E. Grinfeldt, T. K. Rostovtseva, S. Ye. Glushakova, A. B. Moshnikova, A. T. Kozhich, Institute of Cytology, Russian Academy of Sciences, St. Petersburg; Institute of Physicochemical Biology imeni A. N. Belozerskiy, Moscow State University imeni M. V. Lomonosov; Institute of Bioorganic Chemistry imeni A. A. Shemyakin and Yu. A. Obchinnikov, Russian Academy of Sciences, Moscow; UDC 577.352.2]

[Abstract] Elucidating the mechanism underlying the infection of cells by viruses requires study of the initial state of infection, i.e., the interaction of fusion peptide and cell surface, during which the functionally important change in the ion permeability of the cell membrane may take place. Bimolecular lipid membranes with incorporated fusion peptides are best suited for such study. The researchers here chose to use a synthetic polypeptide that consisted of 23 amino acid residues structurally similar to the Lassa arenavirus fusion peptide and that induced the fusion of small single-layer liposomes in a study of the features of the interaction of that peptide and bilayer lipid membranes consisting of dioleoyl phosphatidylcholine; they demonstrated the ability of the peptide to form single cation-selective channels with varying conductance levels. The amplitude histogram of the single channels contained four components with average values of 4.5, 8.2, 10.1, and 12.4 pSi for bilayers in 0.1 M solutions of KCl, pH 7.4, at 21°C and peptide concentrations of 2×10^{-9} M. Peak number and position was a function of peptide concentration in the aqueous solution, their ion composition, pH value, and temperature. The heterogeneity of levels of conductance was attributed to the presence of various aggregates of fusion peptide molecules. Figures 5, references 20: 2 Russian, 18 Western.

Spectral Properties of a Bacteriorhodopsin Analog Obtained Via the Insertion of 4-Keto-Retinal Into Bacterioopsin in vivo

937C0091A Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 10 No 2, Mar-Apr 93 [manuscript submitted 29 Jun 92] pp 140-144

[Article by L. S. Broun, A. B. Druzhko, A. A. Kononenko, S. K. Chamorovskiy, V. Yu. Shakhbazyan, Moscow State University imeni M. V. Lomonosov; Institute of Theoretical and Experimental Biophysics, Russian Academy of Sciences, Pushchino; UDC 577.322]

[Abstract] One of the most promising methods of studying the interaction of bacterioopsin and the chromophore in bacteriorhodopsin involves the use of analogs that are proteins obtained via the replacement of retinal with a synthetic analog. There are two primary techniques for performing the replacement: incubation of the analog with apomembranes and cultivation of halobacteria that are defective in terms of retinal synthesis on a medium to which a given retinal analog is added. Since replacement with the first technique has a negligible effect on protein structure and interprotein interactions, and the purple-membrane hydroxylaminolysis involved leads to irreversible changes in properties, the second technique is thought to produce analogs with a protein structure that is closer to native and with certain properties that differ from those of analogs obtained with the first technique. The researchers here studied the structural and functional differences between the bacteriorhodopsin 4-keto analog obtained via the insertion of a retinal analog into apomembranes consisting of either the R1M1 or ET-1000 strains and the pigment obtained via the cultivation of the JW-5 mutant retinal-free strain on a medium containing 4-keto-retinal. The absorption spectrum of the pigment from the JW-5 strain had no retinal-oxime absorption band, but did possess a minor band at 410 nm that, in terms of peak, coincided with the band of brown-membrane cytochrome b. The circular dichromism spectrum of the pigment lacks the typical pronounced doublet, and one positive band predominates, with only small distortions. Opsin fluorescence output is twice that in 4-keto-BR, and the spectral peak is shifted toward longer wavelengths by 2-3 nm. No light-adaptation spectral effects were observed in the pigment from the JW-5 strain. The dependence of the constant for the intermediate M rates of decay is lg(k) approximately -pH/5 at pH 5-7, and lg(k) approximately -pH/1.25 at pH 7-9. Figures 2, references 32: 9 Russian, 23 Western.

Observation and Description of Mitochondrial Plasmid-Like DNA of Cotton

937C0096 Kiev BIOPOLIMERY I KLETKA in Russian Vol 8 No 3, May-Jun 93 [manuscript submitted 03 Jul 91] pp 19-23

[Article by T. Yu. Yusupov, R. M. Nauruzbayeva, I. R. Khazratov, A. P. Ibragimov, Institute of Experimental Plant Biology, UzSSR Academy of Sciences, NPO Biolog, Tashkent; UDC 577.113:633.51]

[Abstract] In recent years, increasing attention has been devoted to the study of the genetic system of chloroplasts and mitochondria as a result of the possibility of the use of intact organelles and their genetic elements in experiments involving genetic and cell engineering. Particularly noteworthy is the analysis of ARS fragments of DNA of cell organelles and plasmids as a possible means of engineering potential plant vectors. The work reported here represents the first time mitochondrial plasmid-like DNA of cotton has ever been identified and described. The mitochondrial DNA was isolated from etiolated cotton shoots via differential and equilibrium ultracentrifuging in a CsCl-Hoechst 33258 density gradient. Electron microscopy and electrophoresis in agar gel showed that the mitochondria of *G. hirsutum* L. (108-F) contain, in addition to the principal high-molecular-mass DNA, two mini-ring DNA of 6.5 and 2.4 kbp. The plasmid-like DNA was found to contain no appreciable traces of nuclear or plastid DNA. Figures 4, references 12: 5 Russian, 7 Western.

The Effect of the Vaccine Strain of Plague Microbe on the Fusion of Lysosomes With Phagosomes in Peritoneal and Alveolar Macrophages

947C0102C St. Petersburg TSITOLOGIYA in Russian Vol 35 No 6-7, Jun-Jul 93 (manuscript received 12 Nov 90) pp 105-108

[Article by G.I. Vasilyeva, A.K. Kiseleva, and Ye.P. Doroshenko, Antiplague Scientific Research Institute, Russian Federation State Committee for Sanitary-Epidemiological Oversight, Rostov-na-Donu]

[Abstract] The microbicidal effect of macrophages is primarily due to the functioning of lysosomes, and many researchers consider an elevated lysosome content and intensified secretion of lysosomal enzymes signs of macrophage activation. The participation of lysosomal enzymes in the intracellular killing process depends not only on their synthesis, however, but also on processes ensuring their contact with absorbed microorganisms, which is to say on the fusion of lysosomes with phagosomes. Evidence exists that fusion of lysosomes with phagosomes does not always guarantee intracellular killing. In particular, the reports regarding the relationship of the plague microbe *Yersinia pestis* with lysosomes have been contradictory. Consequently, a study was conducted to examine the effect of a vaccine strain of *Yersinia pestis* on the fusion of lysosomes with phagosomes in peritoneal and alveolar macrophages. Nonpedigree guinea pigs weighing 250 to 300 g each were immunized either subcutaneously or aerogenically with a vaccine strain of *Yersinia pestis* (10 guinea pigs were immunized in each case). Peritoneal and alveolar macrophages of the immunized animals were studied on days 1, 7, 14, and 21 after immunization to determine their lysosome content and the fusion of the lysosomes with phagosomes. The experiments established that the frequency of fusion of lysosomes with phagosomes in the alveolar macrophages was only half that in the peritoneal macrophages. Subcutaneous immunization stimulated the fusion of lysosomes and phagosomes in the peritoneal macrophages but not in the alveolar macrophages, whereas aerogenic vaccination stimulated the fusion of lysosomes with phagosomes in both types of macrophages. A correlation between the macrophages' ability to kill *Yersinia pestis* and the frequency of fusion of lysosomes with phagosomes was established. It was hypothesized that during endocytosis of plague microbe in unvaccinated guinea pigs, there occurs a suppression of the fusion of lysosomes with phagosomes that is much more pronounced in the case of alveolar macrophages than in the case of peritoneal macrophages. Figures 2; references 12: 5 Russian, 7 Western.

Detecting Human DNA in Cell Hybrids by Method of Polymer Chain Reaction

947C0102B St. Petersburg TSITOLOGIYA in Russian Vol 35 No 6-7, Jun-Jul 93 (manuscript received 17 Dec 92) pp 74-78

[Article by S.A. Bulat, M.V. Filatov, and R.A. Pantina, Saint Petersburg Institute of Nuclear Physics, Russian Academy of Sciences, Gatchina]

[Abstract] Cell hybrids containing human chromosomes or their fragments against the "background" of the hamster or mouse genome are among the most popular tools for analyzing the human genome. Until now, attempts to create and maintain such hybrids have been fraught with a number of problems. A fundamentally new technique for detecting human DNA based on a polymerase chain reaction [PCR] with arbitrary primers (referred to as the AP-PCR method) has been developed. The new method was tested on two previously created hybrid clones representing a cross of Chinese hamster (VL79-γ-8) and the human cell line HeLa. The yeast strain *Saccharomyces cerevisiae* 15V P4 was used as a negative control. Genome DNA that yielded well-differentiated PCR patterns when amplified with two different arbitrary primers (21 and 45) was isolated from the hybrid clones and from the pure cell lines. From the standpoint of the appearance of their PCR patterns, the two hybrid clones produced with the two different primers were in no way different from the starting hamster line. Dot hybridization of the amplified DNA of these clones with tagged human amplified DNA clearly demonstrated the presence of human DNA, however. The DNA of the yeasts amplified with primer 45 yielded

the same negative result as the hamster DNA. In the human genome DNA (HeLa), researchers succeeded in amplifying those unique, strictly specific genome sequences that, when used as a tagged probe, revealed homologous human DNA in the DNA cell hybrids and thus confirmed their hybrid nature. Dot hybridization with the amplified hamster DNA used as a probe demonstrated that hamster-specific sequences are completely absent in the human DNA amplified with the same primer. Similar results were obtained for primers 21 and 45. The new AP-PCR, which is said to be without analogues, was deemed suitable not only for detecting human DNA in interspecific hybrids but also in identifying human chromosomes by in situ hybridization or cross dot hybridization with monochromosomal human hybrids. The new AP-PCR method was said to possess the following distinctive features:

- the selection of primers is unlimited (no knowledge of nucleotide sequence is required when constructing primers, and paired combinations of primers may be used to make sequencing easier;
- one and the same primer may be used to identify the DNA of both organisms whose genomes constitute a given cell hybrid;
- the result of amplification is always positive (the amplifiability of DNA is directly controlled)
- the presence of DNA is judged not by the fact of amplification but rather by the capability of the amplified DNA under analysis to hybridize with human DNA amplified with the very same primer.

(This study was partially financed with funds provided by the Human Genome State Scientific-Technical Program [grant No. 350].) Figures 2; references 26: 6 Russian, 20 Western.

Obtaining Clones of "Man x Chinese Hamster" Hybrid Cells Containing Various Parts of the Human Genome

947C0102A St. Petersburg TSITOLOGIYA in Russian Vol 35 No 6-7, Jun-Jul 93 (manuscript received 6 Oct 92) pp 68-73

[Article by M.V. Filatov, S.A. Bulat, Ye.A. Drobchenko, L.V. Kotlovanova, R.A. Pantina, Ye.V. Semenova, S.I. Stepanov, A.N. Tretyakov, and O.G. Shcherbakova, Saint Petersburg Institute of Nuclear Physics, Russian Academy of Sciences, Gatchina]

[Abstract] A set of techniques has been proposed for obtaining hybrid cell lines representing a cross between human and Chinese hamster cells. Specifically, the technique of introducing exogenous genetic material into cells by transfecting the cells is proposed as a way of overcoming existing problems with genetic markers. The transfected material serves to mark various segments of the genome in the different cell clones. These portions of the genome may then be preserved in cell hybrids by using a selective medium. The human DNA preserved in the hybrids may be obtained and tested in two ways: 1. by karyotyping the hybrid cells by means of continuous cytometry (which makes it possible to identify and sort human chromosomes as individual peaks on the resultant histogram and 2. by obtaining large amounts of human DNA from the hybrids by a chain polymerase reaction with primers homologous to the consensus sequence of Alu-repeats specific for human DNA. The experiments conducted to test and illustrate the proposed procedure were performed on a subclone of a crossed line of lung fibroblasts of Chinese hamster (V79-γ-8). A culture of human embryo lung fibroblasts served as the primary culture. The cells were grown in Eagle's medium plus either 20 percent bovine serum or 10 percent embryonal calf serum and 5 percent human umbilical cord serum. The plasmid psv2neo, which caries a gene of resistance to the antibiotic G418, was used to transfect the human fibroblasts. The plasmid was introduced into the cells by electroporation. The transfected cells were selected in a medium containing the antibiotic G418 (500 μg/ml). To obtain the cell hybrids, the researchers incubated the cell mixture in a suspension with phytohemagglutinin (10 μg/ml) for 10 minutes. This was followed by centrifugation and processing of the cells for 1 minute with 50 percent polyethylene glycol. The hybrid cells were selected in a medium with a reduced serum content (7 percent) in the presence of 500 μg/ml antibiotic. The primer Alu-517 was used in the chain polymerase reaction. After the polymerase reaction had been completed, aliquots of amplified DNA (volume, 2 μl) were separated in 1.8 percent agarose in 0.75xTAE buffer. Several dozen clones of human embyro lung fibroblasts resistant to 500 μg/ml of the antibiotic G418 were obtained. Cells cloned for several months in the absence of G418 retained their resistance to the antibiotic, thus indicating the stable integration of the plasmid into the chromosomal DNA. The experiments confirmed that the primer Alu-517, when used in a chain polymerase reaction with DNA, amplifies only the DNA of the hybrids and HeLa cells and not the DNA of Chinese hamster cells. The primer and chain polymer reaction made it possible to detect human DNA in all of the clones analyzed, whereas conventional continuous cytometry only resulted in the preservation of human chromosome in one of the three clones analyzed. Figures 3, tables 2; references 13: 2 Russian, 11 Western.

Use of Peroxidase-Antiperoxidase Method to Determine Cell Antigens on Cryostate Sections Via IKO Monoclonal Antibodies

937C0080B Moscow KLINICHESKAYA LABORATORNAYA DIAGNOSTIKA in Russian No 4, Jul-Aug 92 [manuscript submitted 17 Jul 91] pp 59-62

[Article by V. V. Pochinko, V. V. Novikov, Nizhegorod Medical Institute imeni S. M. Kirov; Nizhegorod Scientific Research Institute of Epidemiology and Microbiology, Ministry of Health, Russian Federation; UDC 616.153.96-097-078.33]

[Abstract] One of the most promising trends in immunomorphology is the use of EIA, a variation of which is

the peroxidase-antiperoxidase method. The discovery of new monoclonal antibodies allowing the identification of various antigens of normal and tumorous tissue has expanded the capabilities of morphological research. Peroxidase immunoassay has enabled the evaluation of local immunity and the morphological study of the role of various populations of lymphocytes in the immune response, as well as the identification of micrometastases in regional lymph nodes. Despite that, the technique is little used in Russia, because of the inadequate amount and inadequate variety of high-quality reagents and the small number of studies of the procedures associated with the technique. The researchers here developed a variation of the peroxidase-antiperoxidase method that enables immunomorphological studies on cryostate sections of tissue of benign and malignant tumors of the mammary gland, as well as of regional lymphatic nodes removed in radical mastectomy. The work involved the monoclonal antibodies IKO-1, IKO-12, IKO-31, IKO-86, and IKO-90. Among the round-cell infiltrates both of benign and malignant tumors, the most pronounced expression was noted for the CD3 antigen, which is typical of T lymphocytes and was identified with IKO-90. CD3-positive cells were found to predominate. CD22- positive cells among the infiltrates was approximately equal to or a little more numerous than those with benign tumors, with a ratio of 1:2 in relation to CD3-positive cells. In regional lymphatic nodes without metastatic damage, IKO-90$^+$ cells were noted most often in the paracortical area as focal clusters. IKO- 12$^+$ cells were identified, as a rule, in lymphoid follicles as focal clusters. Usually, the center of the follicle was represented as B-cells, with lymphocytes on the periphery expressing CD4 and CD8 antigens. IKO-31$^+$ and - 8$^+$ cells were noted most often as clusters in the interfollicular regions. Lymphocytes labelled with the monoclonal antibodies of IKO-1 were found in the follicles, pulpy cords, and interfollicular regions. Figures 3, references 7: 5 Russian, 2 Western.

EPIDEMIOLOGY, MICROBIOLOGY, AND VIROLOGY

Instructions on Registration of Potentially Hazardous Chemical and Biological Substances

Moscow ROSSIYSKIYE VESTI in Russian No 124, 1993 pp 4-5

[Instructions on Registration of Potentially Hazardous Chemical and Biological Substances, approved by V. I. Danilov-Danilyan, minister of environmental protection of the RF as No 37-2-7/435, dated 25 May 1993, and by Ye. N. Belyayev, chairman of the State Committee for Sanitary and Epidemiological Oversight as No 01-19/22-22, dated 25 May 1993; registered with the RF Ministry of Justice, registry No 279, on 18 July 1993]

[Text]

1. General Statutes

1.1. These instructions were prepared to implement Decree No 869 of the Russian Federation, dated 12 November 1992, "On State Registration of Potentially Hazardous Chemical and Biological Substances" and in accordance with the Statute on State registration of potentially hazardous chemical and biological substances, which was adopted in the said Decree.

1.2. State registration of potentially hazardous chemical and biological substances (hereafter referred to as State registration) is performed to implement the requirements in articles 12, 13, and 14 of the Russian Federation Law on Sanitary and Epidemiological Welfare of the Public, and articles 51 items 2 and 3 of the Russian Federation Law "On Environmental Protection."

1.3. State registration is implemented in a Russian Register of potentially hazardous chemical and biological substances (hereafter referred to as Register) for detection, accumulation of physicochemical, toxicological, eco-toxicological and other information, record-keeping and regulation of said substances in order to prevent their deleterious effects on human health and the environment.

1.4. An individual naturally occurring or synthetic substance (compound) that can have a deleterious effect on human health and the environment, when produced, used, transported, processed, as well as in household use, is considered a potentially hazardous chemical and/or biological substance.

1.5. All individual chemical and biological substances (compounds), including those contained in mixtures, produced and/or used on the territory of the Russian Federation, as well as imported substances, are subject to State registration.

Substances containing impurities formed in the production process or when used are registered as individual substances.

1.6. Compound commercial chemicals, which must undergo hygienic certification in accordance with Decree No 1, dated 5 January 1993, of the Goskomsanepidnadzor [Russian State committee for sanitary and epidemiological oversight], are not subject to State registration.

1.7. The procedure for State registration established in these Instructions does not extend to chemical and biological agents used to protect plants, farm crop and tree plantation growth regulators, pharmaceutical preparations, as well as radioactive substances, which are recorded or registered following previously established procedure by pertinent organizations.

1.8. Chemical and biological substances intended for production and use after 31 March 1993 ("new substances") are subject to registration prior to production and use.

Substances produced, used and processed on the territory of the Russian Federation, as well as imported, prior to 31 March 1993 ("old substances"), are subject to mandatory State registration within three years from the time of publication of these instructions. Specific registration dates must be coordinated with agencies of State sanitary oversight before 1 July 1993.

2. Procedure for State Registration

2.1. Chemical and biological substances (compounds) are registered when submitted by ministries, agencies, enterprises, organizations, institutions, other juridical entities, as well as individuals responsible for production and import of a given substance (compound), regardless of forms of ownership.

2.2. The registration process includes receiving applications, examining them and making the decision to register, and issuing a registration certificate.

2.3. The "List of information needed for State registration of potentially hazardous chemical and biological substances," which is filled out by the applicant who is responsible for accuracy of furnished data, is the basis for registration.

2.4. Substances for which complete information could not be submitted at the time of registration, but the properties and area of application of which warrant belief that its hazard to man and the environment is immaterial, are subject to registration for a term of 3 years with assignment of a State registration number and issuance of registration certificated with annotation of the 3-year validity. Fullness (or lack of necessity to submit data for some parameter or other) of submitted information is determined in each specific instance by the Register in accordance with existing standard-setting and methodological documentation.

If an applicant does not submit the necessary information within 3 years, as stipulated in the certificate, the registration certificate is no longer valid.

2.5. In the Register, there is a permanent group of experts, which is confirmed following established procedure, representing institutions of the Goskomsanepidnadzor of the Russian Ministry of Environmental Protection examines the most difficult cases related to making decisions on State registration of potentially hazardous chemical and biological substances.

2.6. Assignment to a chemical and biological substance of a State registration number and issuance of a registration certificate confirm the adequacy and quality of ecotoxicological and other parameters, and serve as grounds to enter them in standards and specifications documentation (NTD, such as GOST, TU and others) in the sections "Safety requirements" and "Environmental protection."

2.7. The finding as to conformity of specific production and use conditions for a substance with a State registration number to environmental protective and sanitary rules, adequacy of methods of assaying substances and conformity to NTD (GOST, TU, and others), as well as hygienic certification, are implemented by agencies of State sanitary and epidemiological oversight and Ministry Environmental Protection of the Russian Federation in accordance with sanitary and environment protective legislation.

2.8. Assignment of a State registration number and issuance of registration certificate are implemented on the basis of the expert finding of the Register's specialists and its approval by the director of the Register.

2.9. When registering a substance, the applicant remits payment in advance to the Register in accordance with the Statute approved by Decree No 552 of the Russian Federation Government dated 5 Aug 92, as well as for upgrading performance and material-technical support of the system of State registration of potentially hazardous chemical and biological substances.

2.10. Applications for State registration are addressed in the name of the Register's director at 101479 Moscow, Vadkovskiy Lane, 18-20.

2.11. Documentation for registration must include:

2.11.1. a referral (cover letter) signed by an enterprise administrator or individual entrepreneur;

2.11.2. filled out "List of information needed for State registration of potentially hazardous chemical and biological substances" (Appendix 1);

2.11.3. materials, on the basis which the "List of information...." was filled out;

2.11.4. payment authorization to pay for the registration fee;

2.11.5. official conclusion of the applicant as to possible publication of State registration materials in the free press.

2.12. Registration materials are to be examined within 30 days. After assignment of a registration number, the Register issues a certificate of State registration of the established specimen (Appendix 2) and information form (Appendix 3) to the applicant, and publishes information about registration in the Register's information bulletin.

2.13. Validity of a registration certificate can be suspended by the Register if new data are received concerning previously unknown hazardous properties of a substance. The Register notifies the applicant of suspension of the registration certificate and/or ban on the substance within 10 days of making this decision, and publishes this information in the Register's information bulletin.

2.14. The Register guarantees confidentiality of information about a substance that is an industrial secret unless it poses a threat to humanhealth and environmental safety.

2.15. The Register may, under specific conditions, rightfully refuse to issue a registration certificate.

2.16. An appeal of the Register's decision must be filed, no later than 30 days after it is made, with the chairman of the Russian Goskomsanepidnadzor. The appeal is examined within 30 days. The decision of the chairman of the Russian Goskomsanepidnadzor may be appealed in Arbitration Court.

2.17. Enterprises and other business entities, regardless of the agency to which they pertain and form of ownership, organizations and institutions situated on the territory of the Russian Federation, individuals carrying out development, production and use, export and import of potentially hazardous chemical and biological substances bear responsibility in accordance with the "Statute on State registration of potentially hazardous chemical and biological substances," approved by Decree No 869 of the Russian Federation Government dated 12 November 1992.

Appendix 1 1.State Committee of Sanitary and Epidemiological Oversight of the Russian Federation 2.Ministry of Environmental Protection of the Russian Federation 3.Russian Register of Potentially Hazardous Chemical and Biological Substances 4.List of Information Needed for State Registration of Potentially Hazardous Chemical and Biological Substances

Chemical name of substance (UPAC) Molecular formula 17 Molecular (atomic) mass Structural formula Synonyms Trade name NTD Registration numbers according to: CAS 30 RTECS Purity of substance: 20 % Admixtures (name and amount) 30 30 60

1. Physicochemical parameters 1.1. Physical state (at 20°C, 760 mm Hg) 15 Solid 25 Liquid 25 Gas 1.2. Boiling point 35 °C 1.3. Melting point 35 °C 1.4. Density 35 g/cm^3 25 g/l 1.5. Solubility in water and oils 1.6. Miscibility (substance, water) at 20°C 1.7. pH 25 at concentration of 10 mg/l water 1.8. Odor: 1.9. Reactivity 1.10. Manufactured form

2. Conditions of safe storage and handling, transportation and use

3. Toxicity 3.1. Acute toxicity (oral, inhalation, dermal) 3.2. Cumulative properties 3.3. Clinical signs of acute poisoning 3.4. Most vulnerable organs and systems 3.5. Minimal active dose (concentration) 3.6. Irritation 3.7. Dermal absorption 3.8. Sensitization 3.9. Embryotropic action 3.10. Gonadotropic action 3.11. Mutagenic action 3.12. Carcinogenic action

4. Hygienic standards and classes of hazard (according to PDK /OBUV

5. Method of identification (guidelines, sensitivity, NTD for technique) 5.1. In air of work zones 5.2. In atmosphere of populated areas 5.3. In water 5.4. In other environmental objects

6. First aid for poisoning

7. Ecological safety 7.1. Stability under abiotic conditions (1/2t) 7.2. Transformation in the environment 7.3. Biological disassimilation BD = BPK5/KhPK x 100% 7.4. Total BPK 40 mg O/dm^3 7.5. KhPK 40 O/dm^3 7.6. Acute toxicity in fish 7.7. Acute toxicity in *Daphnia magna* fleas 7.8. Toxic effect on algae (in culture) 7.9. PDK(ODU) in fisheries 20 mg/l 7.10. Toxic effect on soil invertebrates 7.11. Effects demonstrated in model and naturally occurring ecosystems

8. Additional information

9. Sources of Information Applicant Date 20 199

[Stamp:] Exclusively for RV

Appendix 2.

State Committee of Sanitary and Epidemiological Oversight of the Russian Federation

Ministry of Environmental Protection of the Russian Federation

Russian Register of Potentially Hazardous Chemical and Biological Substances

Certificate of State Registration of Potentially Hazardous chemical and Biological Substances

40 No 40 State registration number 40 3 10 199 Issued to 30 (applicant) It is hereby certified that 25 (chemical name according to IUPAC) 25 (CAS No) 25 (synonyms) 25 (trade name) 25 (area of application)

is registered in the Russian Federation Certificate is valid for 40 Director of Register 40 Place for seal

Appendix 3

State Committee of Sanitary and Epidemiological Oversight of the Russian Federation Ministry of Environmental Protection of the Russian Federation

Russian Register of Potentially Hazardous Chemical and Biological Substances

Information Form for Potentially Hazardous Chemical and Biological substances

Chemical name of substance (IUPAC) Molecular formula 30 Molecular mass Structural formula Synonyms Trade name NTD 27 Registration numbers according to: 25 CASn/40 RTECS Area of application Organizations that performed toxicological, hygienic and ecological evaluation, their addresses and telephone numbers

Purity of substance 20 % Admixtures (name and amount) 60 % 30 30

1. Physicochemical parameters 1.1. Physical state (at 20°C, 760 mm Hg) 15 Solid 25 Liquid 25 Gas 1.2. Boiling point 35 °C 1.3. Melting point 35 °C 1.4. Density 35 g/cm^3 25 g/l 1.5. Solubility in water 25 soluble (mg/l 25 insoluble 25 20°C 5 °C 0 in oils 1.6. Miscibility (substance, water) 3 20°C 1.7. pH 25 at concentration of 10 mg/l water 1.8. Odor: 5 strong 5 marked 5 mild 5 none 1.9. Reactivity 1.10. Manufactured form 1.11. Additional information

2. Storage and use conditions 2.1. Special precautionary measures during transportation, storage and handling 2.2. Incompatibility with following substances 2.3. Hazardous dissociation products 2.4. Personal safety equipment: 3 Gas mask 3 Goggles 3 Gloves 3 Other 2.5. Measures in decanting and pouring 2.6. Utilization

3. Flammability and combustibility 3.1. Flash point10 °C 3.2. Temperature range of flame 20 °C 3.3. Concentration range of flame 20 vol. 3.4. Possibility of thermal degradation 10 yes/no 5products formed 3.5. Means of quenching: 3 Water 3 CO_2 3 Foam 3 Dry powder 3 Other 3.6. Special fire-prevention and explosion-prevention measures

4. Toxicity 4.1. Acute toxicity 5 LD_{50} (mg/kg) 5 Route 5 Animal species 15 LC_{50}(mg/m^3) 5 Exposure time (h) 5 Animal species 4.2. Cumulative effect 10 Strong 10 Moderate 10 Mild 4.3. Clinical signs of acute poisoning 4.4. Most vulnerable organs and systems 4.5. Doses (concentrations) with minimal toxic effect (threshold, size, route and time of intake, animal species) 4.6. Irritation 10 skin 10 yes/no 10 eyes 10 yes/no 4.7. Dermal absorption 5 yes 5 TL_{50} 5 no 5 not studied 4.8. Sensitization 5 yes 5 no 5 not studied 4.9. Embryotropic action 5 yes 5 no 5 not studied 4.10. Gonadotropic action 5 yes 5 no 5 not studied 4.11. Mutagenic action 5 yes 5 no 5 not studied 4.12. Carcinogenic action in man: 5 yes 5 no 5 not studied n0 in animals:n mild 5 moderate 5 strong 5 not studied

5.Hygienic standards

5 PDK/OBUV 5 PDK/OBUV 5 PDK/ODU 5 MDU 5 PDK/ODK 5 (air) 5 (work zone) 3(water) 5 (food) 5 (soil) m.r. 10 mg/m^3 5 m.r. 10 mg/m^3 7 mg/l 7 mg/kg 7 mg/kg s.s. 10 mg/m^3 5 s.s. 10 mg/m^3

6. Classes of hazard (according to PDK) 10 atmospheric air 10 work zone air 10 water

7. Method of determination 7.1. Principle involved, sensitivity, NTD for method**

8. First aid for poisoning

9. Ecological safety 9.1. Stability under abiotic conditions (1/2t): 430 days 8 30x7 days 4 7x1 d 5 1 hour and 5 1 d 1 h extremely stable 3 very stable 4 stable 3 somewhat stable 3 unstable 9.2. Transformation in the environment: 10 none 10 is transformed 10 transformation products 9.3. Biological disassimilation BD = (BPK_n/KhPK) x 100% 30 90% (complete) 30 50x90% (mild) 30 20x50% (insignificant) 30 10x20% (difficult) 30 10% (does not break down) 9.4. Total BPK 40 mg O/dm^3 9.5. KhPK 40 O/dm^3 9.6. Acute toxicity in fish 3 LC_{50} (mg/l) 5 species 5 Exposure time (hours) 9.7. Acute toxicity in *Daphnia magna* [water fleas]: 20 LC_{50} (mg/l) 12 Exposure time (hours) 9.8. Toxic effect on algae (in culture): 20 LC_{50} (mg/l) 12 Exposure time (hours) 9.9. PDK(ODU) in fisheries 20 mg/l 9.10. Toxic effect on soil invertebrates: 20 LC_{50} (mg/l) 12 Exposure time (hours) 9.11. Effects demonstrated in model and naturally occurring ecosystems

10. Additional Information

Sources of Information

Footnotes: *Underline standard corresponding to its meaning. **Area of application of method.

[Stamp:] Exclusively for RV

[Key: BPK - biological oxygen requirement; LC - lethal concentration [?]; KhPK - chemical oxygen requirement; m.r. - expansion unknown; MDU - maximum permissible level; NTD - standards and specifications documentation; OBUV - safe level in air?; ODK - total permissible concentration?; ODU - total permissible level ?; PDK - maximum permissible concentration; RV - Substance Register; s.s. - expansion unknown; TL - expansion unknown; TU - specifications]

Method of Identifying Antigens of Salmonella and Yersinia Adsorbed on the Erythrocyte Surface

937C0080C Moscow KLINICHESKAYA LABORATORNAYA DIAGNOSTIKA in Russian No 4, Jul-Aug 92 [manuscript submitted 16 Oct 91] pp 71-72

[Article by A. G. Valiyev, A. I. Kamilov, F. Z. Nizamov, First Tashkent Medical Institute; UDC 616.153.962.4-097]

[Abstract] Reports have been filed in recent years to the effect that with burns and a number of infectious diseases, specific antigens not only bind into immune complexes, but are also partially adsorbed on the surface of erythrocytes and thrombocytes. Although that is of diagnostic and predictive significance, methods for identifying antigens adsorbed on the surface of formed elements of the blood are procedurally complex, special equipment is required, and reagents are expensive. The researchers here have devised a simple, specific, fast method for identifying specific antigens—salmonella and yersinia—on the erythrocytes surface. The method, based on the fact that erythrocytes with adsorbed specific antigens enter into a hemagglutination reaction when they interact with specific antibodies, is called hemagglutination reaction with autoerythrocytes. The diagnostic value of the reaction was checked by means of examination of essentially healthy individuals and individuals with acute Flexner dysentery, viral hepatitis A, or staphylococcal diarrhea. In the healthy individuals and the individuals with dysentery and hepatitis A, in the presence of nonadsorbed agglutinating serum of salmonella and yersinia, the reaction was positive in titres of 1:5 and 1:10. In individuals with salmonellosis and yersiniosis, in the presence of nonadsorbed agglutinating serum of salmonella and yersinia, the reaction

was positive in 85 percent and 90 percent of the observations, in titres of 1:80 to 1:640. Reaction titre declined in a gradual, statistically reliable manner when the individuals' conditions improved. The researchers conclude that the diagnostic titre is 1:20 or higher. References 2 (Russian).

New Possibilities in Optical Reconstructive Surgery in the Anterior Segment of the Eye

937C0101 Moscow OFTALMOKHIRURGIYA in Russian No 1, 1992 [manuscript submitted 28 Jun 91] pp 5-8

[Article by S. N. Fedorov, S. N. Bagrov, A. O. Aksenov, A. V. Osipov, A. V. Bubnov, N. F. Buraleva, Interbranch Scientific and Technical Complex Mikrokhirurgiya glaza; UDC 617.7-089]

[Abstract] Injury to the iris worsens considerably the post-traumatic process in ocular tissue, impairs visual function, and contributes to the development of corneal dystrophy, secondary glaucoma, and other complications that lead to work disability. Since reconstructive iridoplasty is one of the primary stages in the comprehensive treatment of anterior-segment pathology, the researchers here set out to evaluate the possibilities associated with optical reconstructive surgery involving artificial iris transplants developed at the Mikrokhirurgiya glaza complex. The transplant is prepared from a fundamentally new biosynthetic material—a collagen copolymer with monomers of an acrylic series filled with inert dyes. In eight individuals, the clinical course of the postoperative period depended on the severity of the initial injury. In four individuals with earlier injury, local edema of the cornea in the scar area disappeared by the end of the second week. Stages 1 and 2 Tyndall phenomenon were no longer present by days 5 and 6 against the backdrop of steroid therapy. Minor hyperemia was observed for 5-6 days. Visual acuity improved to 0.2-0.3 in four patients within a period of one week to three months. No specific complications were observed in the late postoperative period. Early postoperative response was less pronounced in two individuals with postsurgical colobomas. Two individuals with congenital cataract and aniridia, the postoperative course was uncomplicated. Visual acuity reached 0.5 in two individuals, but vision was not completely restored, because of amblyopia. Figures 3, references 9: 8 Russian, 1 Western.

Health Fund Sponsors Baby Food Production

947C0002A Moscow FEDERATSIYA in Russian No 19, 18 Feb 93 p 4

[Interview with Aleksandr Aleksandrovich Baranov, renowned scientist and physician, by Nikolay Vasilyev under the "Be Healthy!" rubric: "Is the Family Necessary?"; first paragraph is boldface FEDERATSIYA introduction]

[Text] **"Family—nucleus of society" is a customary combination. [Family] is the foundation or base of any government. But who in our time is thinking about this very foundation? Decide for yourself—What indeed is there to say about the family? Nevertheless it is today celebrating a singular anniversary. It is a year since the creation of the International Fund for the Protection of Motherhood and Childhood. And its president, the renowned scientist and physician A. Baranov has himself suggested talking with us about the current maternal and child health status in Russia because it is impossible to keep silent any longer. [Baranov]** Evidently, a few statistics for a beginning. In Russia there has been a catastrophic decrease in the birth rate. This year the figure will amount to approximately 25 percent. This is an unprecedented for us. Such was not the case during the war.

Some are trying to prove that this is not really so bad. In Europe, for example, the birth rate has been traditionally low in recent years. Denmark, on whose level we are now, is cited as an example. These are false figures. The point is that when compared with the Danes, we have a 40-fold higher maternal mortality rate and a 5-fold higher child mortality rate. Are such incorrect comparisons—we and they—possible?

From the standpoint of perspective, it is better here to take Germany, Israel, and America, which have until recently stimulated immigration. They understand that the worker will make their government prosper and strengthen its power. They give shelter citizens from various countries of the world, and we unfortunately cannot take care of our own children and women.

Recently a new and dangerous trend has made itself known. The child mortality curve has moved upward since June 1991. I will mention that before then, it had decreased steadily for 3 years. The maternity hospitals in Moscow, and yes throughout all of Russia, today stand empty or half empty. I think the reasons are clear and common for all of society: the meagerness of financing, the lack of the most elementary drugs, the low salaries of medical personnel, etc. And indeed before the collapse of the Union a program was undertaken to construct modern maternity hospitals throughout the entire country. Now when will there be time for them?

[Vasilyev] Excuse me, but why build if they are now standing empty?

[Baranov] The trouble is that in our country health care has always seemed to be in the background of society. The things we just never built—KamAzes [i.e., automobiles produced by the Kamsk Automotive Plant], canals, dams. The programs we just never thought of. The medicine we just never paid attention to. Maybe it's a commonplace situation. Specifically, the overwhelming number of our maternity hospitals are in old impractical buildings or buildings that are simply falling to pieces. That is why we must build.

[Vasilyev] We have spoken with you about the birth rate. But what about maternal health...

[Baranov] Here, as you understand, the situation is hardly any better. Four million abortions are performed in our country each year as opposed to 1,700,000 births. There is no larger number of abortions anywhere in the world, hence the maternal mortality and various female diseases and the overall health of the nation.

Our fund has chosen the task of family planning as its main direction. The question is whether to do something that should be a government task under the power of some fund. Of course not. Our goals are more modest. We want to help the government in this matter.

The point is that the fund has united in its ranks renowned specialists and scientists in the field of protecting maternal and child health. We already have departments open in Georgia, Kyrgyzstan, Azerbaijan, the Crimea, Nizhniy Novgorod, Ivanovo, Khabarovsk, Irkutsk, and Stavropol. There is even a department in Washington, and one is now being registered in Belgium. Our intent is to make use of all of the advantages provided by this form of public organization, namely, speed, flexibility, and informality, in solving one problem or another.

What specifically have we set as our task? To begin a family planning campaign and, above all, to fight to reduce the number of abortions. Correct family planning can reduce maternal mortality by 40 percent and can cut the infant mortality rate in half.

And here, above all, the need for contraceptives must be met. We used to buy them. But it is impossible to live on purchases. We must create our own industry. We have found a Dutch firm called Organon that is examining our proposal to sell coils and Marvenol contraceptive tablets in Russia. The firm produces the world's best product of its type. In general, we feel that if some production process is created in Russia, it should be geared toward the highest-quality products.

Estimates show that it really possible to begin manufacturing coils and contraceptives by the end of 1993. We are planning to increase annual production to 7 million units plus 80 million packages of Marvenol. This will fully meet Russia's need.

Of course the fund cannot sustain such a gigantic program itself. Government help is needed. We have approached parliament with our proposals. It apparently supports our proposal and is now thinking of a way to provide more specific assistance.

[Vasilyev] Production, as far as I can see, is only part of the problem. And what about the rest—increasing the overall, let us say, medical level of service to mothers and the necessary consultations?

[Baranov] You are right, the problem cannot be solved by the manufacture of contraceptives alone. We are also planning to create a network of women's medical centers in Russia. There they will see, first and foremost, women from what is called the high-risk group. They will be given the necessary examinations and consultations.

Such a center has already been created in Moscow based on the former Maternity Hospital imeni Guberman. The building lay empty for an entire year owing to pretensions of a sanitary-epidemiologic station. We asked Moscow's mayoralty to release it to the fund, and they met us halfway. Repairs are now under way there. We are hoping that the center will begin operating soon. It will be equipped with the most modern equipment. In a year we are planning to have as many as 50,000 women seen in it. There is also an agreement with Nizhniy Novgorod to create an analogous center.

You understand, the fund is acting as a kind of catalyst. We know all the bottlenecks of our health care and, without waiting for the government to get moving, are trying to eliminate them. We have more than a few helpers abroad. We are very hopeful that when people learn more about our ideas and plans in our native Fatherland, they will come to our aid.

[Vasilyev] Aleksandr Aleksandrovich, don't you have the feeling that all attempts to save medicine are doomed. It can collapse together with the entire economy. Unfortunately, all your good beginnings will not come to pass.

[Baranov] I am an optimist by nature. If I adopt your philosophy of doom, I will have to fold my arms and wait for the end to come. But life goes on. And sooner or later the economy, and medicine along with it, will move uphill anyway. Our task is to help these processes. And how can one live without a future?

I would like to continue. We have implemented two more programs. One is related to vaccination, and the other involves baby food.

With respect to vaccination, we have begun working with the American firm Lederle, which is one of the world's two biggest firms in this area. It currently produces AKDS [expansion not given] vaccine, which is being used successfully against pertussis, diptheria, and measles. We found a place far from Moscow in Obolensk where facilities may be established to produce this vaccine. A study of the project is now under way. I will add that it is one of today's best. And we are maintaining our approaches here.

I think that one of the most complicated situations in Russia today is that of baby food. Our next program is related to just this problem. Previously, the USSR had five large factories producing baby food that met 60 percent of the country's need. Now after everyone has scattered to his own corner, only two factories remain in Russia. They meet only 40 percent of Russia's demand. The problem is most critical. We have reached an agreement with the leaders in the Stavropol Kray to construct a plant there. We have long been conducting talks with foreign firms on this score. There are two concrete partners; unfortunately, they have still not made a final decision.

But we also have our own developments in this area. Scientists from the Nizhniy Novgorod Microbiology and Epidemiology Scientific Research Institute and Pediatrics Scientific Research Institute have created a unique product that is a substitute for baby food—lactobacteriosis. Its taste is reminiscent of foreign yogurt but it is much more valuable from the standpoint of its qualities. It may also be used successfully by workers in toxic industries, in the Chernobyl zone, and in regions of ecological trouble.

A shop producing this product is already operating at the Rossiya state farm [sovkhoz] near Nizhniy Novgorod. We had wanted to set up production at small shops producing this foodstuff. We have now found manufacturing shops based at a defense plant. Next year we are planning to launch 10 such shops. The process is simple, and the raw material is available. Eventually we want to increase facilities to launch 50 shops a year. The objective is to cover the entire country with such small shops producing baby food.

[Vasilyev] These are alluring plans. But excuse my indelicate question. They are all just plans; is there anything concrete?

[Baranov] The U.S. government has allocated $1.5 million for creation of a Neonatal Intensive Care Center. We are organizing it on the basis of the Morozov Hospital in Moscow. Our partner in the United States is Norfolk Children's Hospital. The building is being renovated. Our physicians are training to work with the very latest equipment. The department will be open next year. The creation of another seven such centers is planned.

Interview With Head of Humanitarian Aid Commission

937C0291A Moscow TRUD in Russian 28 Jul 93 p 2

[Article; "Donations for Russia: Do They Reach The Designated Recipient?"; first paragraph is TRUD introduction]

[Text]There was a delegation of the Russian Government Commission on Humanitarian and Scientific-Technical Aid, headed by A. A. Zhitnikov, its deputy chairman, in the FRG. It discussed matters of further collaboration, participated in preparation of a new document that deals with various aspects of relations between the two countries in this direction. Our Bonn correspondent, R. Kolchanov, took advantage of this opportunity to interview A. A. Zhitnikov:

[Question] What is the extent of humanitarian aid and how large a part is Germany playing in it?

[Answer] Humanitarian aid to Russia is coming from more than 60 countries. Last year, we received about 500,000 tons of foodstuffs, as well as many drugs and medical equipment both along government lines and from hundreds of private organizations. In the first half of this year, the volume of food aid alone constituted a million tons. Germany's share is quite appreciable. Let me mention such major organizations as the German Red Cross and CARE-Deutschland. Of course, we have expressed our most sincere appreciation to all donors who have to exert much effort to collect and transport food.

[Question] The aid is intended primarily for the socially depressed population strata in Russia....

[Answer] According to our estimates, they constitute 30-35 million people: pensioners, invalids, large families, refugees who have left their homeland because of conflict situations.

[Question] Humanitarian aid is usually given for a specific, short period of time, but the factors you have mentioned will apparentlyprevail, regrettably, for a long time to come in our country. Shall we seek aid in the future also?

[Answer] In the difficult transitional period that Russia is experiencing, millions of people are in need of social support. The government is making an utmost effort to alleviate their situation, but we do not have enough funds. As of June, the deficit in the budget earmarked for social programs constituted about 150 million rubles, and this does not include health care or expenses related to migration. We are trying to bridge the gap at the expense of humanitarian aid. For example, deliveries, in the form of aid, of American grain will enable us to get about 25 billion rubles to support the needy. In this regard, we are negotiating with other governments as well. So that humanitarian aid to Russia is simply a necessity for the time being.

[Question] Does it really reach the people for whom it is intended and to a full measure?

[Answer] There are representatives of different departments, nongovernment organizations and clergy in our Commission. There are local humanitarian aid headquarters. Administration heads are personally responsible for its distribution. In recent years direct contacts are developing, and we are encouraging this: hospital to hospital, city to city, and foreign children's institutions to ours.

[Question] Still, there are quite a few reports, including some in the German mass media, to the effect that some of the aid is being stolen and sold through speculative entities.

[Answer] Humanitarian aid from foreign countries is handled in two ways: it is sent directly to the needy, or it is sold. For example, you cannot deliver grain from door to door, and the proceeds from it go to pensioners, students and school lunches. That was the case, for example, with the 155,000 tons of food received through the Commission of European Communities. In Moscow, the proceeds from selling it constituted 4.6 billion rubles and in St. Petersburg, 2.5 billion. The moneys went to the needy.

We proceeded similarly with the 18,000 tons of American butter, 100,000 tons of Taiwan rice and several other forms of humanitarian aid. I should like to stress 5that, in principle, we coordinate our actions with the donors who deliver these products to us. Our aim is to have part of the humanitarian aid used "for the future," for development of production.

[Question] The Commission does not have its own shops. Through what channels is such aid implemented?

[Answer] We are making a careful study of the capabilities of those who express the wish to participate in handling products received as aid. Sale is categorically prohibited without the Commission's special permission. The entire process is reflected in documentation, and we monitor it through the pertinent departments.

[Question] Nevertheless, one can find products obviously received in the form of humanitarian aid in numerous stands loaded with alcoholic beverages and smoking materials.

[Answer] We have checked this repeatedly. We learned that the products are offered to the stand owners by those who received them as aid in order to use the proceeds for other, more needed items. We are much more concerned with the instances of direct stealing.

[Question] Is there much theft?

[Answer] The losses from theft constituted about 35 million rubles. Of course, this is very sad and outrageous. But the losses related to selling items of humanitarian aid are much lower, as compared to the total aid which amounted to about 35 billion rubles last year, than in ordinary trade. It is nonsense that the commercial structures supposedly get rich from this aid. Anyone who sells products with our permission sets prices that are slightly below market prices for speedy sale, and is compensated only for inevitable expenses, for example, transport.

The Commission, however, does not spend a single ruble of deductions from humanitarian aid to maintain its staff of 18 people.

[Question] However, you are the target of unfavorable criticism?

[Answer] I wish to note that humanitarian aid is often used in Russia as an arena for political battle. What sins have not been placed upon us! However, recently, a commission of the Ministry of Finance Control Administration failed to find any abuses in our performance.

[Question]I should like to hope that soon potentially wealthy Russia will no longer have to seek help in foreign countries....

[Answer] We are experiencing a very difficult period, but there is no turning back. The road ahead toward implementing reforms, with consideration of present needs and interests of the socially less protected strata of the population, should ultimately lead to success.

RF Decree on Psychiatry

937C0407A Moscow ROSSIYSKIYE VESTI in Russian 17 May 93 pp 4-6

[Decree No 377 of the Council of Ministers—Russian Federation Government On Implementation of the Russian Federation Law" On Psychiatric Aid and Citizen Rights When Rendered" signed by V. Chernomyrdin, chairman of the Council of Ministers—Russian Federation Government, on 28 Apr 93]

[Text]To implement the decree of the Supreme Soviet of the Russian Federation dated 2 July 1992, "On Procedure for Putting Into Effect the Law of the Russian Federation 'On Psychiatric Aid and Citizen Rights When Rendered,'" the Council of Ministers—Russian Federation Government hereby decrees to:

1. Adopt the attached List of medical psychiatric contraindications for different forms of professional activity and activity related to sources of high risk, and Statute on procedure of issuing licenses for rendering psychiatric aid to State, non-State, psychiatric, neuropsychiatric institutions, and psychiatrists in private practice.

2. Establish that psychiatrists, other specialists and health care workers with special training and necessary qualifications are allowed to participate in psychiatric care. Qualifications, as well as upgrade of qualifications, are confirmed following procedure established by the Russian Federation Ministry of Health.

The question of allowing health care workers to participate in psychiatric care is decided by the administrator of a psychiatric and neuropsychiatric institution or psychiatrist in private practice in accordance with existing legislation.

3. Ask the Russian Federation Ministry of Labor to examine, following established procedure, the question of extending the total annual vacation time for health care and other personnel involved in rendering psychiatric care.

4. Ask the Russian Federation Ministry of Health, together with the Russian Federation Ministry of Justice, Russian Federation Ministry of Public Protection and other concerned ministries, State committees and departments of the Russian Federation to accomplish the following before 15 September 1993:—prepare draft laws on amendment of legislative acts of the Russian Federation related to adoption of the Russian Federation Law "On Psychiatric Aid and Citizen Rights When Rendered," for subsequent submittal to the Russian Federation Supreme Soviet;—develop and submit for approval to the the Council of Ministers—Russian Federation Government draft statutes on:——institutions rendering extramural and in-hospital psychiatric aid;——therapy-oriented industrial enterprises to provide occupational therapy, training in new occupations and job placement at said enterprises, for individuals with mental disorders, including invalids;——dormitory facilities for individuals with mental disorders who have lost social contact.

Statute on Procedure for Issuing Licenses for Psychiatric Care to State, Non-State Psychiatric, Neuropsychiatric Institutions, and Psychiatrists in Private Practice

Approved by Decree No 377 of the Council of Ministers—Russian Federation Government on 28 April 1993.

1. In accordance with Article 18 of the Russian Federation Law "On Psychiatric Aid and Citizen Rights When Rendered," State, non-State psychiatric and neuropsychiatric institutions (hereafter referred to as institutions) and physicians in private practice must have a State license to render psychiatric aid (hereafter referred to as license) in order to render psychiatric care.

It is prohibited to engage in psychiatric aid without a license.

2. The license indicates the complete name of institution or surname, name and patronymic of a psychiatrist in private practice, their legal address and types of medical activities involved in psychiatric care for which permission is granted.

3. Licenses are issued by licensing commissions (hereafter referred to as commissions) formed in State administrative agencies.

4. In order to obtain a license, institutions and psychiatrists in private practice submit an application to the commission, with indication of types of medical activities to render psychiatric care and the following documents:—for institutions: charter or statute approved following established procedure; founding contract or contract on joint activities; documents about structure and staff of the institution, qualifications of employees; documents about available space, instruments and equipment conforming to the requirements imposed for the declared forms of activities;—finding as to technical condition of building;—for psychiatrists in private practice: copy of diploma received upon graduating from a higher medical educational institution;—copy of work book [service record] confirming tenure in the field of psychiatry;—other documents confirming qualifications of the psychiatrist and his performance in rendering psychiatric care;—documents about available space, instruments and equipment conforming to requirements imposed on declared forms of activities;—finding as to technical condition of building.

5. The commission examines applications for a license from institutions and psychiatrists in private practice within 2 months from the day the applications are received with all necessary documentation.

6. In the event issuance of the license is refused, the commission informs the applicant in writing about the reasons for the refusal, which may be appealed in legal form.

7. The names of institutions and psychiatrists in private practice are recorded in the pertinent unified State register.

8. A license may be suspended or revoked by a court decision.

9.List of medical psychiatric contraindications for some forms of professional activities and activities related to source of danger. Medical psychiatric contraindications for some forms of professional activities related to effects of toxic substances and deleterious industrial factors

Approved by decree No 377 of the Council of Ministers—Russian Federation Government dated 28 April 1993.

10.Chronic and protracted mental disorders with severe, persistent or frequently exacerbated pathological manifestations, epilepsy with paroxysmal disorders constitute general medical psychiatric contraindications for the types of work listed in the table. Marked forms of borderline mental disorders are discussed individually in each case. Additional contraindications are listed in Column 2.Certification must be repeated at least once every five years. General laboratory and functional tests; electroencephalography.

Hazardous and deleterious substances and industrial factors (A denotes allergens)	Jobs. ADDITIONAL MEDICAL PSYCHIATRIC CONTRAINDICATIONS
1	2
Chemical	
Nitric acid	Production and use, processes related to recovery thereof
Ammonia	Same
Nitrous oxides	Production and use of acrylonitrile, methyl methacrylate, ethyl acrylate and others
Acrylic and methacrylic acids, esters thereof, nitriles A	Same
Amino-, nitro-, nitroso-nitro-chloro compounds of aromatic series	Production and use of trinitrotoluene, dinitrophenol, dinitrobenzene, aniline, trimethylene trinitramine, dinitrochlorobenzene and others, urotropin. Production and use of xylidine, cresols, picric acid and others
Amino compounds of aliphatic series and their derivatives	Production and use
Ethylenimine and other immuno compounds A	Same
Amines of aromatic series: benzidine and compounds thereof, dianisidine, toluidine and compounds thereof, naphthylamines	Production and use (including laboratory work). Use of dyes based on them

Hazardous and deleterious substances and industrial factors (A denotes allergens)	Jobs. ADDITIONAL MEDICAL PSYCHIATRIC CONTRAINDICATIONS
Barium and compounds thereof	Production and use of soluble barium compounds. Production and use of insoluble barium compounds
Benzene and its derivatives (toluene, xylene, styrene and others).	Production and use (including laboratory work) of benzene. Production and use of homologues and derivatives of benzene (isopropylbenzene, styrene, toluene and others). ADDITIONAL CONTRAINDICATIONS: TOXIC AND NARCOTIC SUBSTANCE ADDICTION
Halide derivatives of aromatic series	Same
Halide benzyls, benzylidene chloride	Same
Azo dyes	Production and use Anthraquinone, phthalocyanyl [typo for cyanine?] dyes Same
Beryllium and compounds thereof A	Production and use of metal beryllium and compounds thereof, preparation of blend, mechanical processing of ceramic items made of beryllium oxide, production of beryllium-containing alloys
Beta-naphthol	Production and use
Bromine and compounds thereof	Production and use
Halide derivatives of hydrocarbons of fatty series	Production and use (including laboratory work) of dichloroethane, carbon tetrachloride, vinyl chloride, methylene chloride, methyl chloride, chloroform, ethyl bromide, trichloroethylene, chloroprene and others ADDITIONAL CONTRAINDICATIONS: TOXIC SUBSTANCE ADDICTION
Hydrazine and compounds thereof	Production and use
Dimethyl formamide, dimethyl acetamide and others fatty acid amides	Production and use
Isocyanates A	Production and use
Artificial and synthetic fibers A	Production. Mechanical processing, dyeing: a) processing of fibers (oxalon, synthetic high-polymer materials, aramide, carbon-containing); b) heat treatment. Preparation and use of lubricants
Cadmium and compounds thereof	Production and use
Coke-oven gas and other coking products	Production of coke and coke-oven gas, trapping coking products, rectification of trapped hydrocarbons, distillation and processing of coal tar at coking by-product plants. Work involving preparation and paving with bitumen concrete, with use of products of the coking by-product industry (coal tar, resin, sand, and others)
Silicone compounds and lubricants based on them A	Production and use
Lithium and compounds thereof	Production and use
Manganese and compounds thereof	Production and use of manganese oxides, welding materials (electrodes, powdered-metal wire, flux). Casting manganese steel and other metals containing more than 10% manganese, production of organic manganese compounds. Extraction of ore and processing thereof, use of inorganic manganese compounds in ground form
Methanol	Production and use, processes related to its recovery
Arsenic and compounds thereof	Extraction, production and use of organic and inorganic arsenic compounds; processes related to their recovery
Nickel A and compounds thereof	Production and use
Organic vulcanization accelerants, antiagers, vulcanization inhibitors and others A	Production and use of captax, altax, thiuram, neozone D and others
Perhydrol	Production and use
Pesticides	Production and use in the national economy of organochlorine, organophosphorus, carbamic acid derivatives, organometal and other pesticides, as well as storage in warehouse and primary cotton processing

Hazardous and deleterious substances and industrial factors (A denotes allergens)	Jobs. ADDITIONAL MEDICAL PSYCHIATRIC CONTRAINDICATIONS
Saturated and unsaturated hydrocarbons	Operation, repair of wells and installations in extraction of oil, processing high-sulfur and sulfur oil, natural gas, pyrobenzene; selective purification of oils, pyrolysis; removal of hydrogen sulfide from oil and gas; cleaning tankers, tanks, reservoirs; ozocerite-extracting production; production of various synthetics (phenol, acetone, synthetic fatty acids, alcohols and others). Ancillary processes related to servicing freight yards, taking samples, laboratory testing of raw intermediate and end products (high-sulfur and sulfur oil and natural gas). Operation, repair of wells in oil extraction; processing low-sulfur petroleum and natural gas; extraction and processing of ozocerite, regeneration of motor vehicle and aircraft oils; processes related to recovery and use of saturated, unsaturated hydrocarbons (production of polyethylene, divinyl, isoprene and others); use of benzine. ADDITIONAL CONTRAINDICATIONS: TOXIC AND NARCOTIC SUBSTANCE ADDICTION
Rare-earth elements	Industries related to recovery of aerosols of rare-earth elements and compounds thereof
Mercury and compounds thereof	Extraction and melting of mercury and other processes related to its recovery and purification; use for extraction of gas-discharging gold and other metals; production of mercury thermometers and fluorescent lamps, other physical and illumination-engineered instruments, paint, organic mercury compounds; production of substances by mercury electrolysis. Work with instruments in contact with exposed mercury, production of mercury fulminate; work with mercury-arc rectifiers, current transformers, pumps; use as catalysts in chemical processes; use of organic mercury compounds. Production and work with instruments with sealed mercury, use of mercury fulminate in underground mining; work in dental offices with mercury amalgam; production of pharmaceuticals and cosmetic preparations containing mercury
Lead and inorganic compounds thereof	Smelting lead from ore and concentrates; recovery of lead-containing alloys; refinement; recovery of dry lead-containing pigments, bleaches, chrome pigments; Schoop spraying with lead in closed areas, rolling, pressing, coating items with lead; mechanical and manual processing of lead; sintering; casting bearings; production of lead batteries; annealing in lead baths; production of ground lead-containing paint, glaze and enamel; straightening with lead-containing compounds; production and processing of lead-containing glass and fiberglass, welding and cutting surfaces covered with lead-containing ground; painting work with constant use of lead paints; production of lead items. Production and use of piezoceramic and glass-ceramic cement. Concentration of lead ore; pulverization, mixing and other processes related to formation of dust containing lead sulfide; work related to decentralized melting of small amounts of lead, soldering, printing industry (linotype work, manual type-setting, and others)
Selenium, tellurium and compounds thereof	Production and use
Sulfur and compounds thereof	Production and use of organosulfur compounds, sulfanate additives, methyl sulfide compounds, sulfurous and sulfuric acids, processes related to recovery of sulfurous and sulfuric anhydride, hydrogen sulfide
Hydrogen sulfide	Production and use; processes related to recovery thereof
Cyanide compounds	Production and use
Hydrocyanic acid, compounds thereof, cyanamides and others	Same
Synthetic rubber	Production of synthetic rubber and processing thereof (preparation of rubber stock, rubber vulcanization)
Synthetic detergents A	Production of sulfanol, alkylamides, sodium sulfate; chlorination of fraction of paraffin hydrocarbons and others
Synthetic resins and plastics based on:	
—styrene	Production of polymers and copolymers of styrene, polyester resins, varnishes and adhesives on their basis, fiber glass, and others. Processing resins and plastics. Use of resins, varnishes, adhesives
—phenol and formaldehyde A	Production of resins, varnishes, adhesives and others, processing molding powders, molding materials. Use of adhesives, varnishes, impregnating, compounds, binders and others
—silicone compounds	Production of resins, varnishes, liquid silicones, processing polymers, molding materials, use of varnishes, lubricants, resins and others

Hazardous and deleterious substances and industrial factors (A denotes allergens)	Jobs. ADDITIONAL MEDICAL PSYCHIATRIC CONTRAINDICATIONS
—isocyanates A	Production of polyurethanes, foam polyurethanes, polyurea and others, processing and use
—organofluoric compounds	Production of polymers (fluoroplastics) and copolymers; heat and mechanical processing of fluoroplastics
—vinyl chloride and vinylidene chloride	Production of polymers and copolymers, perchlorovinyl, adhesives, varnishes and others; processing resins and plastics, and use of adhesives, varnishes and others
acrylic and methacrylic acids A	Production and processing of polymers, copolymers, use of emulsions, varnishes, paint and others
—amino acids, dibasic acids, diamines A	Production and processing of polyamides; use of adhesives and others
—epichlorohydrin A	Production and use of epoxy resins and plastics based on them, compounds
—aliphatic and unsaturated hydrocarbons (polyethylene, polypropylene)	Production and processing of polymers and copolymers
Shale tars A	Production and use; industries related to extraction thereof
Antimony and compounds thereof	Recovery, processing and use
Thallium and compounds thereof	Production and use; monocrystal growing
Tetraethyl lead	Production of tetraethyl led and ethylating liquid, mixing ethylating liquid with fuel. Use of ethylated gasoline; testing, repair, disassembly and cleaning of aircraft and motor vehicle engines, refueling aircraft and other machines, draining, pouring ethylated gasoline at manually operated stations, cleaning installations and containers at bulk oil plants, gasoline storage tanks, gasoline pumps
Metals A:	
—cobalt, vanadium	Recovery and use of cobalt and compounds thereof
—molybdenum, titanium, zirconium, tungsten and compounds thereof	Recovery of vanadium pentoxide; production of ferrovanadium; processing vanadium-containing slag; Production and use of molybdenum, tungsten and compounds thereof; processing titanium, reduction of metal titanium and compounds thereof; recovery and use of tungsten-cobalt alloys, titanium-cobalt alloys, molding powders with zirconium and compounds thereof
Ursol, ursol dyes and oxidizable dyes A	Production and use; fur dyeing
Pharmacological agents	Production and preparation of ready-made medicinal forms of morphine and its derivatives, vitamins, sulfanilamide, pyrazolone, antineoplastic and hormonal agents, neuroleptics, anticoagulants, anesthetics (halothane), use in anesthesiological practice; preparation of drugs in pharmacies, use of neuroleptics in psychiatric practice ADDITIONAL CONTRAINDICATIONS: ALCOHOLISM, TOXIC AND NARCOTIC SUBSTANCE ADDICTION
Phenols and derivatives thereof	Production and use
Formaldehyde A and other aldehydes of the fatty series	Production and use; processes related to their recovery
Phosphorus and compounds thereof	Production and use of yellow phosphorus, compounds thereof, organophosphorus compounds, including plasticizers. Production and use of red phosphorus; recovery, production and use of phosphates
Phthalic acid, phthalic anhydride and derivatives thereof	Production and use
Fluorine and compounds thereof	Production and use of fluorine and compounds thereof. Electrolytic recovery of aluminum, recovery and use of fluorspar, processes involving recovery of fluorine and compounds thereof
Furans and derivatives thereof, furfurol, tetrahydrofuran and others	Production and use
Chlorine and compounds thereof, chlorine-containing mixtures	Production and use; processes related to their recovery
Chloronaphthalene and compounds thereof (halovax, chloronaphthalenes A and compounds thereof, hydroxynapthalene and naphthol	Production and use
Chromium A, chromous acid A, compounds and alloys thereof	Production and use (including substances containing chromium compounds as secondary constituents)
Biological	
Antibiotics A	Production and use in medical practice and pharmacies

Hazardous and deleterious substances and industrial factors (A denotes allergens)	Jobs. ADDITIONAL MEDICAL PSYCHIATRIC CONTRAINDICATIONS
Productive fungi, protein-vitamin concentrates (PVK), feed yeast, mixed feed A	Production and use of products of microbiological synthesis
Enzyme preparations, biostimulators A	Production and use in medical practice, pharmacies, agriculture and other sectors of the national economy
Allergens, diagnostic and therapeutic; blood preparations A, immunobiological preparations	Production
Infected material and helminth-contaminated material	Work in contact with infected and helminth-contaminated material, with infectious patients
Brucellosis pathogens	Livestock farms (regardless of epizootic condition for brucellosis), enterprises processing raw materials and products of animal origin
Q fever pathogen	Livestock farms in territories with Q fever problem, enterprises processing raw materials and products from livestock stricken with Q fever
Industrial Aerosols	
Abrasive and abrasive-containing substances	Production, processing and use of abrasives (synthetic corundum—aluminum-oxide abrasive, white, chromous, monocorundum), carbide, boron, L-boron, processing and use of silicon carbide and others
Silicon-containing (free and amorphous silicon dioxide)	Prospecting, tunneling work, open and subterranean extraction of ore and adjacent minerals, coal, concentration and processing thereof. Production of silicon, glass, dinas [silica brick], aerosil [silica powder], silicon carbide, silicon-copper alloy, silumin and others; foundry work (earth preparation, casting, stamping, trimming, scraping, cleaning cast). Sandblasting
Metals and alloys thereof	Dry polishing of metal sand alloys; processes of spray-coating metals, producing metal powders and items made with them
Silicates and silicate-containing:	
a) asbestos-containing (10 percent or more asbestos)	Prospecting, mining and processing asbestos ore and asbestos. Production and processing of synthetic asbestos
b) asbestos-containing (no more than 10 percent asbestos)	Production, processing items made of asbestos cement, asbestos bakelite, fiber, asbestos rubber
c) other silicates and silicate-containing substances	Production and processing of glass and mineral fiber, cement, clay, fireclay, naphthalene syenites, disthene-sillimanite, olivine, apatites, mica, dunite, chrome magnesite, forsterite, limestone, barite, "kotlenit," diatomaceous earth, tuffals, pumice, pearlite, iron-ore concentrates and agglomerate in metallurgy and others
Carbons	Extraction, processing and use of coal. Production and use of carbon black, synthetic graphite, coke (oil, pitch, shale and others). Processing and use of natural and artificial diamonds
Dust of plant and animal origin	Processing cotton, flax, hemp, wool, ambary, jute, peat, hops. Production of paper, natural silk and other materials
Dust from inorganic luminophores (including those containing less than 5% cadmium)	Production and use
Welding aerosols	
a) containing manganese (20% or more), nickel, chromium, fluorine compounds, beryllium, lead	Arc-plasma, gas-flame welding, fusingand cutting, contact end-to-end welding (by flashing), electroslag welding of metals. Welding, fusing and cutting of medium- and high-alloy, including stainless, steel, welding and fusing nickel or copper-nickel electrodes and wires on pig iron, welding and cutting beryllium and alloys thereof
b)containing manganese (up to 20%), ferric oxides, aluminum, magnesium, titanium, copper, zinc, molybdenum, vanadium, tungsten	Welding, fusing and cutting carbon, including zinc-coated steel, aluminum, copper, titanium and alloys based on them; welding and fusing pig iron with iron and iron-vanadium electrodes and wires, cutting pig iron
Physical	
Ionizing radiation. Radioactive sources and sources of ionizing radiation	All types of work with radioactive substances and sources of ionizing radiation
Nonionizing radiation:	
—laser radiation	All types of work with lasers

Hazardous and deleterious substances and industrial factors (A denotes allergens)	Jobs. ADDITIONAL MEDICAL PSYCHIATRIC CONTRAINDICATIONS
—electromagnetic (electric and magnetic) radiofrequency fields in the range of 30 MHz-300GHz (VHF, UHF, SHF, EHF) and below 30 MHz (HF, MF, VLF, ILF, ELF, F infrasonic, hypo-low frequency)	All types of work with sources of electromagnetic energy in the indicated ranges
—steady electric and direct magnetic fields	All types of work with sources of direct electric and steady magnetic fields
Industrial vibration	All types of work involving exposure to local or general vibration
Industrial noise	All types of work involving exposure to intense industrial noise, as well as considerable strain on the acoustic analyzer, 81 dB and higher
Ultrasound (contact transmission)	Work with ultrasonic flaw detectors and medical equipment
High atmospheric pressure	Work in caissons, pressure chambers, diving work
Low temperature	Work at constantly low ambient temperature in work zone of industrial premises (below permissible levels according to Sanitary standards for microclimate of industrial premises approved by the USSR Ministry of Health)
High temperature, intense heat emission	All types of work with constant exposure to high temperature (exceeding permissible level according to Sanitary standards for microclimate of industrial premises approved by the USSR Ministry of Health) and intense heat emission (over 140 Wt/m^2) in the work zone
Increased eye strain	All types of work involving increased eye strain: a) Class I precision work (with objects up to 0.15 mm), according to 1980 SNIP [construction standards and regulations], and II (with 0.15-0.3 mm objects); b) classes III and IV precision work (0.5-1 mm objects) according to SNIP, and work which involves tracking screen displays and other means of displaying information
Physical overexertion	Work involving manual handling of heavy items (item in kg) or exertion (in N; 1 N = 0.1 kgf) during a shift (for men): more than 30 kg (or more than 300 N) when done continuously; weight moved or lifted manually per shift (weight turnover per shift)—more than 12 t, when lifting from the floor or a level considerably lower than working surface—more than 5 t. Work related to maintaining a constrained position for a long time, including standing. Work involving local muscular tension, mainly of wrist and arm muscles. Periodically holding up and object weighing more than 10 kg with both hands or more than 5 kg with one hand kg (for men). Work involving periodic marked inclination of the body (visual estimate of more than 30° from the vertical line) more than 300 times per shift; assuming a constrained working position (on one's knees, stooped, lying down, bending forward, in a sling, standing) for more than 50% of the shift. Work involving vocal strain: instructors, speaking, vocal-speaking types of acting, work at a central telephone office

Medical psychiatric contraindications for some forms of professional activities involving increased hazard Chronic and protracted mental disorders with severe, persistent or frequently exacerbated pathological manifestations, epilepsy with paroxysmal disorders constitute general medical psychiatric contraindications for the types of work and occupations listed in the table. Marked borderline mental disorders are discussed on an individual basis in each case. Additional contra-indications and tests are listed in Column 2. Certification must be repeated at least once every five years. General laboratory and functional tests; electroencephalography.

Work, types of professional activities, and job categories	Additional medical psychiatric contraindications. ADDITIONAL TESTS
1	2
Work in high places, work of steeplejacks, and work involving hoisting, as well as work related to servicing scaffolding	Epilepsy and syncopic states. ELECTROCARDIOGRAPHY
Personnel who service working 127-V or higher voltage electric installations, perform ongoing commutation operations, adjust, assemble and carry out high-voltage testing at such electrical installations	Epilepsy and syncopic states. Alcoholism, narcotic and toxic substance addiction (on an individual basis). ELECTROCARDIOGRAPHY
Work in the State Forest Conservation system: felling, rafting timber and primary timber processing	Epilepsy and syncopic states. ELECTROCARDIOGRAPHY
Work in remote regions and underground:	Epilepsy and syncopic states. ELECTROCARDIOGRAPHY

Work, types of professional activities, and job categories	Additional medical psychiatric contraindications. ADDITIONAL TESTS
—work in the oil and gas industries, including use of "on watch" method, in the Extreme North and regions equated to it, desert and other regions that are remote or sparsely inhabited, as well as underwater drilling; all forms of work underground; work at hydrometeorological stations, communication installations situated in desert, tayga and other remote and sparsely populated regions, under difficult climate and geographic conditions; geological prospecting, topographic, building and other work in remote, little-populated, inaccessible, tundra, swampy and mountain regions of the nation (including use of the expedition-watch method); work dealing with organizing recruiting and public appeals for the Extreme North and regions equated to it	
Instrument technicians servicing pressurized containers	Epilepsy (on an individual basis)
Machine operators (stokers), boiler room operators, workers in gas oversight service,	Epilepsy and syncopic states. ELECTROCARDIOGRAPHY
Work involving use of explosives, work in explosion- and fire-hazard industries	Epilepsy and syncopic states. Alcoholism, narcotic and toxic substance addiction. ELECTROCARDIOGRAPHY
Workers in the armed guard and armored vehicle services of the cash collection and delivery system of the Russian Federation Central Bank and other departments and services which are allowed to carry and use firearms (employees of the Internal Security Troops of the Republic of the Ministry of Transportation undergo pre-employment and subsequent regular physicals in accordance with Order No 23Ts of the USSR Ministry of Railways dated 7 Jul 87)	Alcoholism, drug and toxic substance addiction. Epilepsy (on an individual basis)
Gas rescue service, volunteer gas rescue teams, armed units and detachments for prevention and eradication of open gas and oil gushers, armed mountain and mountain rescue units, fire units, emergency medical care service, specialized medical brigades in constant readiness	Mental illness (including remissions). Alcoholism, narcotic and toxic substance addiction. Epilepsy and syncopic states. ELECTROCARDIOGRAPHY
Work on turning lathes, milling machines, other lathes and machines, punch presses	ELECTROCARDIOGRAPHY
Work directly involved with vehicular, including intraplant, traffic	Epilepsy and syncopic states. ELECTROCARDIOGRAPHY
Operators of motor, truck and municipal electric vehicles, including operators of:	
—all types and makes (Category A) of motorcycles, motor scooters, snowmobiles; minitractors and motorized lifts (who have undergone registration with the State Motor Vehicle Inspectorate), motor vehicles with manual controls for all categories of invalids (disabled veterans of the Great Patriotic War and others in the military service, work-related invalids and invalids since childhood);	Borderline mental retardation and retarded mental development (on an individual basis, recertification in 3 years). Epilepsy and syncopic states. Alcoholism, narcotic and toxic substance addiction (allowed if there is persistent remission). ELECTROCARDIOGRAPHY. EXPERIMENTAL PSYCHOLOGICAL TESTING
—all types and makes (Category A) of mopeds;	Epilepsy and diseases associated with narcoleptic and cataleptic episodes. Syncopic states. Disability-group-classified mental illness, and other cases on an individual basis. Alcoholism, toxic and narcotic substance addiction (allowed if there is persistent remission). ELECTROCARDIOGRAPHY. EXPERIMENTAL PSYCHOLOGICAL TESTING
—motor vehicles weighing no more than 3500 kg, with driver's and 8 passenger seats (Category B), with the right to work for hire, operate tractors and other motorized vehicles;	Borderline mental retardation and retarded mental development (on an individual basis, recertification in 3 years). Epilepsy and syncopic states. Alcoholism, narcotic and toxic substance addiction (allowed if there is persistent remission after specialized treatment; in the absence of personality deterioration and somatoneurological disorders, the question of permission to work is decided on an individual basis upon submitting a favorable reference and petition from the employer and information about behavior from internal affairs agencies near place of residence. Narcotic and toxic substance addicts are allowed to work if there has been a persistent remission for at least 3 years). ELECTROCARDIOGRAPHY. EXPERIMENTAL PSYCHOLOGICAL TESTING
—motor vehicles weighing no more than 3500 kg, with driver's and 8 passenger seats (Category B), without right to work for hire;	Borderline mental retardation and retarded mental development (on an individual basis, recertification in 3 years). Epilepsy and syncopic states. Alcoholism, narcotic and toxic substance addiction (allowed if there is persistent remission). ELECTROCARDIOGRAPHY. EXPERIMENTAL PSYCHOLOGICAL TESTING

Work, types of professional activities, and job categories	Additional medical psychiatric contraindications. ADDITIONAL TESTS
—trucks designed to carry loads weighing more than 3500 kg (Category C);	Borderline mental retardation and retarded mental development (on an individual basis, recertification in 3 years). Epilepsy and syncopic states. Alcoholism, narcotic and toxic substance addiction (allowed if there is persistent remission after specialized treatment; in the absence of personality deterioration and somatoneurological disorders, the question of permission to work is decided on an individual basis upon submitting a favorable reference and petition from the employer and information about behavior from internal affairs agencies near place of residence. Narcotic and toxic substance addicts are allowed to work if there has been a persistent remission for at least 3 years). ELECTROCARDIOGRAPHY. EXPERIMENTAL PSYCHOLOGICAL TESTING
—vehicles designed to transport passengers with more than 8 passenger seats, in addition to driver's (category D), tractor-trailers in vehicle categories B, C or D (Category E);	Borderline mental states and retarded mental development. Epilepsy and syncopic states. Alcoholism, narcotic and toxic substance addition. Speech defects and severe stuttering (on an individual basis). ELECTROCARDIOGRAPHY. EXPERIMENTAL PSYCHOLOGICAL TESTING
trolleys, trolley buses;	Borderline mental states and retarded mental development. Epilepsy and syncopic states. Alcoholism, narcotic and toxic substance addiction. Speech defects and severe stuttering (on an individual basis). ELECTROCARDIOGRAPHY. EXPERIMENTAL PSYCHOLOGICAL TESTING
motorized wheelchairs	Borderline mental states and retarded mental development (on an individual basis, recertification in 3 years). Epilepsy and syncopic states. Alcoholism, narcotic and toxic substance addiction (on an individual basis). ELECTROCARDIOGRAPHY. EXPERIMENTAL PSYCHOLOGICAL TESTING
Other types of professional activities and job categories:	
—employees of food industry enterprises, public catering services and trade, dairy farms, dairy kitchens; food distribution centers, bases and warehouses, who come in contact with foodstuffs in production, storage and sales, including those involved in sanitary treatment and repair of stock, equipment, as well as individuals in direct contact with foods while being carried in all types of transportation;	
students at technical schools, schools, general education schools, VUZs [higher educational institutions] before and during on-the-job training in enterprises, institutions and organizations, whose employees are subject to medical psychiatric certification;	
health care workers in surgical hospitals, maternity homes (departments), pediatric hospitals (departments), departments of neonate and premature infant pathology;	Epilepsy (on an individual basis)
employees of educational institutions;	
employees of children's and adolescents' health-improving facilities, including seasonal ones	
employees of preschool institutions, child centers, homes for children, boarding schools, school boarding houses;	
workers in medical-preventive [therapeutic and preventive care] institutions, sanatoriums, rest homes, boarding houses, boarding schools, who are directly involved in organizing patient nutrition;	
workers in enterprises of sanitary and hygienic services to the public (bath-house, shower-room employees, hairdressers, manicurists, pedicurists, cosmeticians, ancillary personnel of laundries, laundry-receiving centers, dry-cleaning establishments);	
swimming trainers and instructors, swimming-pool and therapeutic bath employees who administer treatment;	Epilepsy and syncopic states. ELECTROCARDIOGRAPHY
service personnel of hotels, dormitories, conductors aboard long-distance passenger trains; employees of water-supply installations directly involved in treating water, and individuals who service the water-supply system;	
workers at livestock farms and complexes.	

Notes: 1. All categories of invalids undergo certification by expert medical industrial commissions in order to determine medical psychiatric contraindications to operation of vehicles.

2. Psychiatric certification of workers servicing commercial rail (including underground trains) and aircraft traffic is carried out inaccordance with the list of industries and occupations approved by the Russian Ministry of Railroads and Russian Ministry of Transportation in agreement with the Russian Ministry of Health and Russian Ministry of Labor.

3. Work in high places refers to work performed at a height of 1.5 m or more above ground or floor level, carried out with scaffolding or directly with construction elements, equipment, machinery and mechanisms to install, operate, assemble and repair them.

Steeplejack work refers to work in which the principal means of protection against falling is a sling worn for all work and movement.

4. If there are epidemiological indications in a region, public health agencies, by agreement with relevant labor services and occupation of the public, may augment the list of enterprises and occupations, as well as alter the scope and frequency of psychiatric certification.

5. Employees of institutions rendering psychiatric care undergo psychiatric certification in accordance with the rules for employment and operation of said institutions.

RF Statute and Order on Clinical Residency Programs Statute on Clinical Residency Programs

937C0410A Moscow ROSSIYSKIYE VESTI in Russian 31 Mar 93 p 5

[Statute of the Russian Federation Ministry of Health On Clinical Residencies, signed by P. N. Morozov, chief of Administration of Educational Institutions, addendum to Order No 23 of the Russian Federation Ministry of Health, dated 17 Feb 93]

[Text]

General statutes

1. Clinical residence is a part of the multilevel structure of higher medical education in the Russian Federation, a form of continuous professional education of physicians at higher medical educational institutions and research institutions, medical departments of universities, institutes for advanced training of physicians, which is carried out in order to train or retrain specialists, as well as to upgrade their qualifications.

2. The right of institutions mentioned in Item 1 to train physicians in the form of clinical residency is granted by the Russian Federation Ministry of Health upon submittal of appropriate petition, excerpt from the record of decision of the scientific council and description of basic equipment of the institution with subsequent licensing of such institution.

3. The main object of having physicians take clinical residencies is to train highly qualified specialists for independent work in health care agencies and institutions, or in private practice.

4. Clinical residents are trained according to specialties specified in the existing "List of medical specialties," and in accordance with the curriculum and syllabus for each specialty. According to the Russian Federation Law "On Education," the mandatory minimum of the professional syllabus for a specific medical specialty is determined by the pertinent State standard. The syllabuses for clinical residency and curriculums are approved by the scientific councils of institutions that train clinical residents, and they are revised every 5 years, with consideration of changes in the State standard for educational minimum of professional syllabus for each specialty.

5. The Russian Federation Ministry of Health reserves the right to terminate physician training in the form of clinical residency in institutions where such work is not organized satisfactorily.

6. Clinical residency training takes place away from the main workplace. Training lasts 2 years. If the scientific council of the institution providing clinical resident training raises the question of extending clinical residency to 5 years, permission is granted by the Russian Federation Ministry of Health on an individual basis, depending on the specialty of training. Residencies start on 1 September.

Clinical residency acceptance and training

1. Physicians participate in competitions to be accepted for clinical residency. Citizens of other nations, as well as physicians referred by cost-accounting and departmental (with the exception of those under the Russian Federation Ministry of Health) medical institutions and organizations enroll for clinical residence in medical educational and research institutions of the Russian Federation on a contractual basis, unless other procedures are stipulated in existing legislation.

2. All clinical residency entrants enjoy equal rights, regardless of social origin and financial status, race and ethnicity, sex, language, attitude toward religion, type and nature of work, and place of residence. Restrictions are permitted only on medical contraindications, as well as in cases stipulated by Russian Federation legislation.

3. The rules for acceptance to a clinical residency (conditions, procedure and time of acceptance, number and forms of examinations, rating criteria) are established by institutions that train physicians in clinical residency, they are approved by decision of the scientific councils of these institutions and must be published no later than 3 months prior to receipt of documentation.

4. Individuals who have passed examinations and competition have the right to be enrolled for a clinical residency.

5. To carry out clinical residency enrollment, the administrator of the educational (research) institution announces a competition with a time limit of at least 1

month for applications, he appoints an acceptance commission chairman and approves its members. The acceptance commission comprises representatives of the main clinical specialties.

6. Target numbers for enrolling physicians in a clinical residence are approved annually by the Russian Federation Ministry of Health and reported to health care institutions and agencies in January-February for the next school year. Enrollment in clinical residence on a contractual basis is carried out by institutions that have the right to train clinical residents in excess of the target enrollment numbers approved by the ministry. Reports on filling clinical residency spaces in the current year and applications for the next year are submitted to the Russian Federation Ministry of Health no later than 1 October of each year, with indication of specialties and bases of proposed training. The reports must indicate:—number of physicians accepted for residency (separately, according to target enrollment numbers and contracts);—training specialty;—agencies (institutions, organizations) who referred specialists for training (separately, according to target enrollment numbers and contracts).

7. The application for acceptance in a clinical residency is addressed in the name of the administrator of the institution that trains clinical residents, with enclosure of:—personnel record form [ID] with photo, endorsed by the personnel department, from the last place of employment or study (those who have been unemployed for over 1 year fill out the form used for personnel records at the place to which documentation is submitted);—curriculum vitae;—referral-recommendation from the last place of employment (study) describing the level of professional training, business and organizational traits of applicant, with indication of specialty and purpose of training, and institution to which documentation is submitted for enrollment in clinical residency (for individuals enrolling by special referral and who have worked (studied) at least 1 year prior to submitting documentation for enrollment in clinical residency);—copy of graduation diploma from higher medical educational institution;—passport, military card, and labor book [work permit and record] are submitted personally by the candidate for clinical residency.

8. Travel expenses for individuals referred to specialized clinical residency and after its completion are paid by the referring organizations (institutions). The return trip for individuals who failed in the competition is also paid by the referring organizations (institutions). Individuals who did not complete their individual training program and whose clinical residency was terminated prematurely pay for their own return trip.

9. Physicians who have passed the competition for clinical residency are excused from work by administrators of institutions (organizations), in accordance with existing legislation. A pertinent letter from the educational or research institution that provides training of clinical residents serves as grounds for such action.

10. Physicians undergoing clinical residency training are paid a stipend at the expense of the training institution, in an amount set by the pertinent enforceable enactments or an amount set by the organization (institution) that referred them for training on a contractual basis. Clinical residences who have started training in places funded by the Russian Federation Ministry of Health in accordance with the target enrollment numbers, can receive a supplement to the set stipend from the training institution's stipend fund; in addition, special clinical residents be paid such supplements by referring organizations (institutions). Clinical residents are granted annual leave for a period equal to the duration of annual vacations of practicing physicians in the same specialty; upon completion of clinical residency, they are granted a leave for the same period of time as the leave of practicing physicians in the same specialty, which is paid by the educational (research) institution that trained the clinical residents (for contract residents, by the referring organization (institution)).

11. Physicians accepted for clinical residence receive a stipend from the day of enrollment, but not prior to their receipt of their final payment from their former job.

12. The period of clinical residency training is included in the physician's work tenure.

13. There is mandatory provision of dormitory housing for out-of-town clinical residents. 20. The duration of clinical residency training can be extended by order of the administrator of the institution where clinical residents are being trained, for the duration of maternity or child care leave taken, in accordance with existing legislation, as well as for the duration of the resident's illness when it lasts longer than 1 month, but no longer than the duration of illness, in the presence of pertinent findings by medical institutions. Clinical residents who failed to start their training within 1 month or who have skipped training for over 1 month without a valid reason, as well as those who did not fulfill their individual training programs within the established time, are subject to being terminated by order of the administrator of the educational (research) institution upon being informed by the department (division, laboratory, etc.) head.

14. Expenses involved in extending the term of clinical residency are paid from the stipend fund and resources for personnel training provided by the institution that trains residents or institution (organization) that referred the physician for residency training on a contractual basis.

15. Physicians who have been terminated from a clinical residency can be reinstated for the remaining training period by order of the administrator of the institution which is training clinical residents. A commission makes the reinstatement decisions on an individual basis.

16. Upon reinstatement of clinical residents for the remaining training period, allocation of a stipend should be made on the basis of work tenure as of the time of reinstatement.

17. Transfer of clinical residents from one educational or research medical institution to another is effected by the administrators of these institutions by agreement with the referring organization (institution).

18. Repeated clinical residency is permitted if the candidate needs to acquire another specialty.

19. When the individual program is successfully completed and with theappropriate level of professional training, it is possible to end training at an early date, but duration of clinical residency must be at least 75 percent of its planned term.

20. Physicians enrolling for clinical residency through free competition have the right to independent employment after completion of this training.

Special-purpose clinical residency

1. Acceptance for special clinical residency is carried out according to the program of the Russian Federation Ministry of Health or on the basis of a contract between the institution that trains clinical residents and the institution (organization) that refers the specialist.

2. Administrators of referring institutions (organizations) are responsible for timely and proper screening of candidates for special clinical residency.

3. Upon completion of a special clinical residency, physicians must make themselves available again to the referring institutions (organizations), and have the right to annul the labor contract following procedure established by legislation.

4. All of the rights and duties stipulated in this Statute apply to special clinical residents.

5. Institutions (organizations) that have referred physicians for special clinical residencies must provide them with permanent employment in their specialty in a position that is not lower than their previous one after they have completed the training period.

Forms of training and monitoring performance of clinical residents. Rights and duties of clinical residents

1. Clinical residents are trained on the basis of an individual program elaborated by the residents jointly with a specially appointed department (division, laboratory, etc.) head responsible for training, and it is discussed at department (division, laboratory, etc.) meetings. An amended individual training program, with consideration of the clinical resident's comments, is approved by the administrator of the department (division, laboratory, etc.) no later than 1 month after the physician has started the residency.

Estimation of the work load of professor-instructor staff is based on 3 hours per week per clinical resident, 75 percent of the training time being devoted to the study of the main specialty and 25 percent, to the study of allied disciplines. The instructor to clinical resident ratio is 1.0:3.75.

The list of mandatory allied specialties and disciplines to be studied by the clinical resident is provided in training syllabuses.

2. The load for study and medical-preventive [therapeutic and preventive] care in specialties is determined by the individual program. Payment for on-call duty and other medical-preventive work that is not provided in the individual program is made by the medical-preventive institution. Clinical residents may travel on assignment for up to 30 days for on-the-job training.

3. A clinical resident has the right to have a concurrent job in accordance with existing legislation.

4. Department (division, laboratory, etc.) heads are personally responsible for the quality of training specialists in clinical residencies, and their readiness for independent work on all levels of practical health care.

5. The individual program provides for submitting reports on areas of the main specialty and allied disciplines and delivering papers periodically at department (division, laboratory, etc.) conferences at least once a year. At the end of each year of training, there is certification for all aspects of training.

6. Upon completion of clinical residence, the individuals receive a certificate, the form for which is illustrated, (Appendix) which is attached to the diploma for basic higher medical education.

7. Graduates of clinical residencies have the right to take a qualification examination for the title of specialist before an independent certification commission. Specialists in the educational institution that trained the clinical resident and administrators of the institution where he worked prior to the residency must not be members of the certification commission. The certification commission works in accordance with the Statute "On Procedure for Certification of Russian Federation Physicians for the Title of Specialist."

8. A certificate in the established form, which gives the right to independent medical work, can be issued to individuals who have completed a clinical residency, on the basis of the results of certification and decision of the certification commission.

Appendix to "Statute on Clinical Residencies," approved by Order No 23 of the Russian Federation Ministry of Health, dated 17 Feb 93

Russian Federation Ministry of Health

(higher medical educational institution, research institution, institute for advanced training of physicians, medical department of university)

Certificate Added to diploma of basic higher medical education Series 30 No

Issued to Doctor 20 (Surname, name, patronymic)

to the effect that he (she) was trained from 10 [date] to 10 in a clinical residency at 30

(name of higher medical educational institution, research institution, institute for advanced training of physicians, medical department of university)

and has completed the full course in the specialty of 20

(name of specialty)

Administrator of educational (research) institution 40 (signature)

Secretary 40 (signature)

Official seal City Registration No 30 Date issued 10

Russian Federation Ministry of Justice registered on 26 February 1993

registration No 163 [stamp:] Exclusively for RV [ROSSIYESKIYE VESTI]

Order to Approve the 'Statute on Clinical Residencies'

937C041B Moscow ROSSIYSKIYE VESTI in Russian 31 Mar 93 p 5

[Order No 23 On Approval of "Statute on Clinical Residencies," signed by Minister E. A. Nechayev, 17 Feb 93, Moscow]

[Text]In view of the change to multilevel structure of higher medical education in the Russian Federation and in accordance with the Russian Federation Law "On Education," I hereby order that:

1. The attached "Statute on Clinical Residencies" be approved.

2. Administrators of higher medical educational institutions, research institutions, institutes for advanced training of physicians, territorial health care administrative agencies of the Russian Federation adhere to the said "Statute on Clinical Residencies."

3. The following instruments are no longer in force on the territory of the Russian Federation: "Statute on Clinical Residencies," approved by Order No 362 of the USSR Ministry of Health dated 19 May 1971; Order No 734 of the USSR Ministry of Health dated 6 September 1972; Letter of Instructions No 02-1487-14 of the USSR Ministry of Health dated 29 October 1990; direction No 7 of the RSFSR Ministry of Health dated 20 March 1989.

RF National Fund for Invalids

937C0407D Moscow FEDERATSIYA in Russian No 41, 13 Apr 93 p 61

[Regulation No 202-rp of the RF president On Establishment of National Assistance Fund for Russian Federation Invalids, signed by B. Yeltsin, president of the Russian Federation, on 27 Mar 93]

[Text]for the purpose of assisting in implementation of the initiative of enterprises, institutions, organizations, ad hoc creative groups and individual citizens aimed at achieving in the Russian Federation the goals of the World Program of Action Concerning Invalids:

1. It is deemed purposeful to establish the National Assistance Fund for Russian Federation Invalids (hereafter referred to as the National Fund) as a State enterprise.

2. It is established that the main purpose of the National Fund is to offer expertise, competitive selection and participation in funding innovative programs, plans and measures aimed at solving problems of disability and invalids at its own expense and using other proceedures and resources, including those obtained from the financial and business activities of the National Fund.

3. The composition of the organizing committee to establish the National Fund is to be approved in accordance with the Appendix.

4. The organizing committee for establishment of the National Fund must prepare within 2 months and submit for approval to the the Council of Ministers—Russian Federation Government drafts of founding documentation for the National Fund, proposals pertaining to personnelits administrative agencies, allocation to the National Fund from the Russian Federation State reserves of physical assets of said agencies for export in accordance with the products list and in quantities providing for recovery of hard currency totaling at least one million U.S. dollars, issuing licenses necessary for activities and providing building space for the National Fund.

5. Following established procedure, the Council of Ministers—Russian Federation Government is to allocate the sum of 100 million rubles as the State's contribution to the charter fund of the National Fund.

Fundamentals of Ukrainian Health Law

Fundamentals of Health Care Legislation of the Ukraine

937C0407B Kiev GOLOS UKRAINY in Russian 15 Dec 92 pp 9-13

[Law on "Fundamentals of Health Care Legislation of the Ukraine," signed by L. Kravchuk, Ukrainian president, on 19 Nov 92]

[Text]Each person has the natural, inalienable and inviolable right to health care. Society and the government are responsible to present and future generations for their health and preservation of the gene pool of the Ukrainian people, they provide for priority of health care in activities of the State, improvement of working, educational, living and recreational conditions for the public, solutions of ecological problems, improvement of medical care and adoption of a healthy lifestyle.

The Fundamentals of Health Care Legislation in the Ukraine regulate social relations in this field for the purpose of assuring harmonious development of physical and spiritual strength, high degree of work fitness and long active life for the people, elimination of factors having a deleterious effect on their health, prevention and lowering morbidity, disability and mortality, improvement of heredity.

Section I. General Statutes

Article 1. Ukrainian health care legislation

Ukrainian health care legislation is based on the Ukrainian Constitution and consists of these Fundamentals and other legislative acts approved in accordance with the former, which regulate social relations in the field of health care.

Article 2. International agreements of the Ukraine in the field of health care

If international agreements involving the Ukraine set rules other than those provided by Ukrainian health care legislation, the rules in the international agreement apply.

Article 3. Concepts and terminology used in health care legislation

In these Fundamentals and other health care legislative acts, the main concepts have the following meaning:—health: a state of complete physical, emotional and social well-being, rather than solely the absence of diseases and physical defects;—health care: a system of measures aimed at assuring preservation and development of an individual's physiological and psychological functions, optimum fitness for work and social activities with maximum, biologically possible individual life span;—health care institutions: enterprises, institutions and organizations whose task is to meet the diverse needs of the people in the field of health care, by means of rendering medical-sanitary care, including a broad spectrum of preventive and therapeutic measures or medical services, as well as to perform other functions on the basis of professional activities of medical workers;—medicosanitary care: a set of special measures directed toward helping improve health, broaden knowledge about sanitation, prevention of diseases and disability, early detection of disease, aid to individuals with acute and chronic diseases, rehabilitation of the sick and disabled.

The content of other concepts and terminology is defined by Ukrainian legislation in special glossaries of concepts and terms of the World Health Organization.

Article 4. Basic principles of health care

The basic principles of Ukrainian public health are:—recognition of health care as the priority direction of activities of society and the State, one of the chief factors in survival and development of the Ukrainian people;—adherence to human and citizen rights and freedoms in the field of health care and provision of related State guarantees;—humanistic orientation, priority of general human values over class, ethnic, group or individual interests, increased sociomedical protection of the most vulnerable strata of the population;—equal rights of citizens, democracy and accessibility to all of medical care and other services in the field of health care;—material-technical and financial support must conform, with scientific validation, to the objectives and level of socioeconomic and cultural development of society;—direction toward modern health standards and medical care, combining national traditions and achievements with worldwide know-how in the field of health care;—preventive-prophylactic set of social, ecological and medical approaches to health care;—mixed health care economics and multi-channel funding thereof, combining State guarantees with demonopolization and incentives for entrepreneurism and competition;—decentralization of State administration, development of self-administration of institutions and independence of health care workers on a legal and contractual basis.

Article 5. Health care as the mutual obligation of society and State

State, social and other agencies, enterprises, institutions, organizations, officials and citizens must provide for priority of health care in their own work, without causing harm to health of the public and individual people, to provide within the limits of their competence care for patients, invalids and victims of accidents, cooperate with workers in health care agencies and institutions, as well as perform other duties as provided by health care legislation.

Section II. Citizen Rights and Duties in the Field of Health Care

Article 6. The right to health care

Each Ukrainian citizen has the right to health care, which provides: a) a standard of level, including food, clothing, housing, medical care and social services and security, necessary to maintain health; b) an environment that is safe to life and health; c) sanitary-epidemic welfare of the territory and population center where the individual resides; d) safe and healthy working, schooling, living and recreational conditions; e) qualified medicosanitary aid, including free choice of physician and health care institution; f) reliable and prompt reporting about the health of the individual and health of

the people, including existing and potential risk factors, and severity thereof; g) participation in discussion of drafts of legislative acts and offering suggestions on shaping State policy in the field of health care; h) participation in health care administration and social expertise on these matters according to procedure stipulated by legislation; i) opportunity to form social organizations for the purpose of cooperating in health care; j) legal protection against all illegal forms of discrimination related to health status; k) compensation for harm done to health; l) complaints about illegal decisions and actions of health care workers, institutions and agencies; m) opportunity to obtain an independent expert medical opinion expertise in case of the citizen's disagreement with conclusions of State medical experts, being submitted to forced treatment, and in other cases if the actions of health care workers could infringe upon universally recognized human and citizen rights.

Ukrainian legislation can also define other citizen rights in the field of health care.

Ukrainian citizens abroad are guaranteed the right to health care in the forms and scope provided by international agreements, in which the Ukraine is a participant.

Article 7. Guarantee of right to health care

In accordance with the Ukrainian Constitution, the State guarantees to all citizens the expression of their rights in the field of health care by means of: a) creation of a branched out network of health care institutions; b) organization and implementation of a system of State and social steps to safeguard and strengthen health; c) delivery to all citizens of a guaranteed level of medicosanitary care to the extent established by the Ukrainian Cabinet of Ministers; d) implementation of a State system of gathering, processing and analyzing social, ecological and special medical statistical data; e) establishment of liability for violating rules and legal interests of citizens in the field of health care.

Article 8. State protection of rights to health care

The state recognizes the right of each Ukrainian citizen to health care and health protection.

In the event that legal rights and interests of citizens in the field of health care are violated, pertinent State, social or other agencies, enterprises, institutions and organizations, their executives and citizens must take steps to restore violated rights, protect legal interests and make restitution for damage caused.

Protection of the right to health care in legal form is implemented according to procedure established by legislation.

Article 9. Limitations on citizen rights related to health status

On the basis of and following procedure stipulated by Ukrainian laws, citizens may be declared temporarily or permanently unfit because of health for professional or other activities related to increased danger to others, as well as to performance of specific State functions.

Use of forced medical measures on individuals who have committed socially dangerous acts, limitation of the rights of other citizens in the form of forced medical examination or forced hospitalization, as well as in connection with quarantine measures, are allowed only on the basis of and following procedure stipulated by Ukrainian laws.

Decisions on limiting citizen rights related to their health status may be appealed in legal form.

Article 10. Duties of citizens in the field of health care

Ukrainian citizens are obliged to: a) be concerned about their health and the health of children, and not harm the health of other citizens; b) undergo preventive medical examinations and receive inoculations in cases stipulated in legislation; c) give emergency aid to other citizens who are in life- and health-threatening states; d) perform other duties stipulated in health care legislation.

Article 11. Rights and duties of foreign citizens and stateless individuals

Foreign citizens and stateless individuals residing on Ukrainian territory enjoy the same rights and have the same obligations in the field of health care as Ukrainian citizens, unless otherwise stipulated in international agreements or Ukrainian legislation.

The rights and duties in the the field of health care of foreign citizens and stateless individuals who are temporarily on Ukrainian territory are defined by legislation and pertinent international agreements.

Section III. Bases for Organization of Health Care

Article 12. Health care, the priority direction of State activities

Health care is one of the priority directions of State activities. The State shapes health care policy in the Ukraine and provides for its implementation.

State health care policy is funded by budgetary allocations in an amount conforming to its scientifically validated needs, but no less than ten percent of the national income.

Article 13. Shaping State health care policy

The Ukrainian Supreme Soviet lays the foundation for State health care policy by means of securing constitutional and legal aspects of health care, defining its goals, main tasks, directions, principles and priorities, establishing norms and scope of budgetary funding, creating systems conforming to credit and finance, tax, customs duty and other regulators, and approving the list of comprehensive and special-purpose national health care programs.

In order to solve problems of shaping State health care policy, consultant and expert offices manned by health care specialists and representatives of the community may be formed under the Supreme Soviet of the Ukraine. The procedure for establishing and activities of such agencies are stipulated by the Ukrainian Supreme Soviet.

The health care policy of the Republic of Crimea, local and regional comprehensive and special-purpose programs, which are prepared by the Supreme Soviet of the Crimean Republic, local and regional self-government agencies constitute an integral part of the State health care policy of the Ukraine, and they reflect the specific health care needs of the population of pertinent territories.

Article 14. Implementation of the State health care policy

Implementation of the State health care policy is delegated to of State executive agencies.

The president of the Ukraine is personally responsible for it. In his annual report to the Ukrainian Supreme Soviet, the Ukrainian president reports on the status of implementation of State health care policy.

The Ukrainian president is the guarantor of citizen rights to health care, implements adherence to health care legislation through a system of State executive agencies; he carries out State health care policy and exercises other powers stipulated in the Ukrainian Constitution.

The Ukrainian Cabinet of Ministers organizes elaboration and implementation of comprehensive and special-purpose national programs; he creates economic, legal and organizational systems to stimulate efficient performance in the field of health care; he implements development of a network of health care institutions; he signs intergovernment agreements and coordinates international collaboration on health care issues, and also exercises, within the limits of his competence, other powers placed upon State executive agencies in the field of health care.

Within the limits of their competence, ministries, departments and other central State executive agencies develop programs and forecasts in the field of health care, define unified, scientifically validated State standards, criteria and requirements which should assist in health care for the public; they prepare and place State orders for material and technical support of this sector; they implement State supervision and oversight, and other executive-management activities in the field of health care.

The Crimean Council of Ministers, representatives of the Ukrainian president and subordinated local state administration agencies, as well as executive committees of rural, village and urban councils of people's deputies implement State health care policy within the limits of their authority, as stipulated in legislation.

Article 15. Health care agencies

The Ukrainian Ministry of Health, whose competence is defined in a statute approved by the Ukrainian Cabinet of Ministers, is the specially authorized central agency of State executive power in the field of health care.

The duties of specially authorized State executive agencies in territorial-administrative entities of the Ukraine are delegated to the Health Department of the Crimean Council of Ministers and local State administrative agencies.

Article 16. Health care institutions

Sanitary-preventive, medical-preventive [therapeutic and preventive care] therapeutic physical culture, sanatorium and resort, pharmacy, medical research and other health care institutions are directly involved in public health care.

Health care institutions are established by enterprises, institutions and organizations with different forms of ownership, as well as private individuals, in the presence of the necessary material and technical base, and qualified specialists. Procedure and conditions for establishment of health care institutions, State registration and accreditation of such institutions, as well as procedure for licensing medical and pharmaceutical practice are stipulated in Ukrainian legislative acts.

The health care institution performs its activities on the basis of a charter approved by the proprietor or his authorized agency.

Regardless of juridical status of a health care institution, it can be managed only by an individual that meets the State-established unified qualification requirements. Independence in making decisions on all issues related to health care must be granted to the administrator of a health care institutions.

The Ukrainian Cabinet of Ministers and its authorized agencies, as well as local self-government agencies within the limits of their authority, have the right to suspend the activities of any health care institution, if it violates health care legislation, fails to meet State requirements as to quality of medical care and other activities in the field of health care, or if its actions are in contradiction to its charter.

Article 17. Individual entrepreneurial health care activities

The State supports and encourages individual enterpreneurial activities in the field of health care.

A permit (license) for such activities is issued following procedure stipulated in legislation. Disputes concerning denial of permit (license) are examined in legal form.

Engagement in medical and pharmaceutical practice without the appropriate license is subject to liability as stipulated in legislation.

Article 18. Health care funding

Health care is funded by the Ukrainian State budget, Crimean budget, local and regional self-government budgets, health insurance funds, charitable funds and any other sources that are not prohibited by legislation.

Funds from the Ukrainian State budget, Crimean budget, local and regional self-government budgets, which are allocated for health care, are used to provide the public with a guaranteed level of medicosanitary aid, funding State and local health care programs and basic research on these matters.

The extent of budgetary funding is determined on the basis of scientifically validated norms per capita.

The Ukrainian State budget, Crimean budget, local and regional self-government budgets fund health care institutions accessible to all. Funds that have not been used by a health care institution are not returnable and are not deducted from funding for the next period.

Departmental and other health care institutions servicing only some population categories according to occupation, department or other factor unrelated to the health status of an individual are funded, as a rule, by the enterprises, institutions and organizations that they service. It is allowed to give financial support to such institutions at the expense of the State or local budgets if workers of the pertinent department, enterprise, institution or organization constitute a significant part of the inhabitants of a given locality.

All health care institutions have the right to use resources, to enhance the quality of their work, given voluntarily by enterprises, institutions, organizations and individual citizens, as well as to fix payments for health care services with the permission of a proprietor or his authorized agency.

The State provides for establishment and operation of a system of health insurance for the public. Ukrainian State budget, funds of enterprises, institutions and organizations and citizens' contributions pay for this insurance. Matters of organization of health insurance and use of insurance funds are stipulated in pertinent legislation.

Article 19. Material and technical support of health care

The State organizes material and technical support of health care to the extent necessary to provide the public with a guaranteed level of medicosanitary aid. All health care institutions have the right to make independent decisions on matters of their material and technical support. The State assists in production of medical apparatus, instruments, equipment, laboratory reagents, drugs, prostheses, hygienic supplies and other items necessary to health care, as well as development of trade in such goods.

For this purpose, there are provisions for implementation of State programs of priority development of the medical, biological and pharmaceutical industries, it encourages entrepreneurism and international collaboration in the area of material and technical support of health care, creates a system of relevant taxation, prices, customs and other preferential treatment and regulators.

The State can restrict export of merchandise essential to health care and raw materials to manufacture it, if it could be detrimental to the health care interests of the Ukrainian people.

In order to provide for proper quality of goods needed for health care, their use is permitted only after mandatory trial carried out following procedure coordinated with the Ukrainian Ministry of Health.

Article 20. Scientific support of health care

The state assists in development of research in the field of health care and adoption of its results in the practice of health care institutions and workers. Research carried out by academic and departmental research institutions, educational and other scientific institutions and subdivisions or individual scientists is funded on the basis of competition by the State budget, as well as any other sources of financing that are not in contradiction with legislation.

All State health care programs and most important measures for their implementation are subject to mandatory prior scientific expertise in the leading national and international institutions named by the Ukrainian Cabinet of Ministers.

The Ukrainian Academy of Medical Sciences, which is independent in carrying out research and development, is the highest scientific medical institution of the Ukraine with the status of a self-administered organization.

Article 21. Tax-related and other preferential treatment in the field of health care

Health care institutions and individuals engaged in enterpreneurial health care, as well as business entities that produce items necessary to support the activities of health care institutions enjoy tax-related or other preferential treatment as stipulated in legislation.

Article 22. State monitoring and oversight in the field of health care

Through specially authorized executive agencies, the State monitors and oversees adherence to health care legislation, State standards, criteria and requirements aimed at providing a healthy environment and sanitary-epidemic well-being of the public, norms of professional activities in the field of health care, requirements of the State Pharmacopoeia, standards of medical services, medical materials and equipment.

Article 23. Higher oversight of adherence to health care legislation

Higher oversight of adherence to health care legislation is implemented by the Prosecutor-General of the Ukraine and his subordinate prosecutors.

Article 24. Community participation in health care

Health care agencies and institutions must assist in implementation of citizen rights to participate in health care management and public expertise on these matters.

Public consultant or oversight councils may be formed in health care agencies and institutions, to assist in their work and inform the public, and effect public monitoring in the field of health care.

Professional societies of health care workers and other associations of citizens, including international ones, may participate in defining the content and means of implementation of national and local health care programs, pertinent measures, decisions on personnel, scientific and other problems of organizing State activities in this field.

Section IV. Providing Healthy and Safe Living Conditions

Article 25. Maintenance of public standard of living essential to health

The State provides a standard of living, including food, clothing, housing, medical care, social services and security that is essential to maintain the health of the people.

For these purposes, on the basis of scientifically validated medical, physiological and sanitary-hygienic requirements, unified rates are fixed for minimum wages, pensions, scholarships, social benefits and other incomes of the public, in-kind, including free, supply of food, clothing, drugs and other essential items is organized for the most vulnerable strata of the population; a set of measures is carried out to meet essential needs of refugees, homeless and other individuals who have no definite place of residence; free medical care and social services are provided for individuals who are in difficult financial straits presenting a threat to their lives and health.

Medical, physiological and sanitary-hygienic requirements pertaining to standard of living are approved by the Ukrainian Supreme Soviet.

Article 26. Environmental protection

The State provides for environmental protection as an important prerequisite of human life and health, by means of protecting animate and inanimate nature, protecting people against negative ecological factors, achieving harmonious interaction of individuals, society and nature, wise use and reproduction of natural resources.

Relations pertaining to environmental protection are regulated by pertinent legislation of the Ukraine and international agreements.

Article 27. Providing sanitary-epidemic welfare of territories and population centers

Sanitary-epidemic welfare of territories and population centers is provided by a system of State incentives and regulators aimed at strict adherence to sanitary-hygienic and sanitary-epidemic-control rules and standards, a set of special sanitary-hygienic and sanitary-epidemic-control measures and organizations of State sanitary oversight.

In the Ukraine, unified sanitary-hygienic requirements are established for: planning and construction of population centers; construction and operation of industrial and other entities; purification and decontamination of industrial and municipal emissions, garbage and waste; upkeep and use of residential, industrial and business buildings and territories where they are located; organization of public catering facilities and water supply; production, use, storage, transportation and burial of radioactive, toxic and potent substances; upkeep and slaughtering of domestic and wild animals, as well as for other activities that could endanger sanitary-epidemic welfare of territories and population centers.

Article 28. Providing beneficial working, educational, living and recreational conditions Unified sanitary-hygienic requirements are established for the organization of industrial and other processes related to human activities, as well as for the quality of machinery, equipment, structures, consumer goods and other things that could have a deleterious effect on health, in order to provide working, educational, living and recreational conditions that are beneficial to health, a high level of work fitness, to prevent traumatism and occupational disease, poisoning and other possible harm to health. All State standards, specifications and industrial prototypes must be in agreement with health care agencies following procedure established by legislation.

Proprietors and administrators of enterprises, institutions and organizations must provide in their work for adherence to labor safety rules, industrial sanitation and other labor safety requirements, as stipulated in labor legislation, and must not allow any factors that are deleterious to human health and the environment.

The State implements oversight and monitoring of creation of working, educational, living and recreational conditions beneficial to health, and cooperate in public monitoring of these matters.

Article 29. Preservation of genetic pool of the Ukrainian people

The State implements a set of measures aimed at elimination of factors that have a devastating impact on the human genetic system, as well as establishes a system of State genetic monitoring, organizes medicogenetic aid for the public, assists in enrichment and dissemination

of scientific information in the field of genetics and demography, in the interests of preserving the gene pool of the Ukrainian people, preventing a demographic crisis, assuring the health of future generations and prevention of hereditary diseases.

Medical interventions that could impair the human genetic system are prohibited.

Article 30. Prevention of dangerous infectious diseases

The State provides for regular, scientifically validated prevention, treatment, localization and eradication of mass scale infectiousdiseases.

Individuals who are carriers of pathogens of infectious diseases that are dangerous to the public are removed from work and other activities that could be instrumental in the spread of infectious diseases, and they are subject to medical supervision and treatment at the State's expense, with payment, if necessary, of social insurance benefits. Mandatory physical examinations, preventive inoculations, therapeutic and quarantine measures may be carried out, following procedure established by Ukrainian laws, for some particularly dangerous infectious diseases.

In case of danger of onset or spread of epidemic diseases, the president of the Ukraine, in accordance with Ukrainian laws and recommendations of health care agencies, can call for special working, educational, traffic and transportation conditions and schedules over the entire Ukrainian territory or individual localities, which are aimed at averting the spread of such diseases and eradicating them.

Local State administrative, regional and local self-government agencies must actively cooperate in implementation of epidemic-control measures.

The list of particularly dangerous and dangerous infectious diseases, and conditions for declaring that someone has an infectious disease or is a carrier of the pathogen of an infectious disease are determined by the Ukrainian Ministry of Health and published in official sources.

Article 31. Mandatory physical examinations

Preventive physical examinations are organized, for the purpose of safeguarding public health, for minors, pregnant women, employees of enterprises, institions and organizations that have deleterious and hazardous working conditions, military personnel and individuals whose professional or other activities are related to services for the public or increased danger to others.

Proprietors and administrators of enterprises, institutions and organizations are held responsible for timely mandatory physical examination of their employees and consequences that are deleterious to health of the public, which have been caused by permitting individuals to work without undergoing a mandatory physical examination.

The list of population categories subject to mandatory physical examinations, their frequency, sources of funding and procedure of such examinations are determined by the Ukrainian Cabinet of Ministers.

Article 32. Furthering a healthy lifestyle

The State assists in the public in developing a healthy lifestyle by means of dissemination of scientific information on health care matters, organization of medical, ecological and physical education, implementation of measures aimed at improving hygienic education of the public, provision of necessary conditions, including medical supervision, for physical culture, sports and tourism, development of a network of preventoriums, recreational bases and other health-improving institutions, at control of habits that are deleterious to human health, establishment of a system of socioeconomic incentives for individuals who have a healthy lifestyle.

Holding healing sessions and carrying out other analogous measures involving use of hypnosis and other mental or bioenergetic methods aimed at a mass audience are prohibited without special permission of the Ukrainian Ministry of Health, in order to prevent harm to health of the public.

Section V. Treatment and Preventive Care

Article 33. Providing treatment and preventive care

Treatment and preventive care are provided to Ukrainian citizens by polyclinics, hospitals, dispensaries, clinics of research institutes and other accredited health care institutions, emergency medical care service, as well as individual medical workers with the appropriate permit (license).

Special medical-preventive institutions are established to give therapeutic and preventive care to Ukrainian citizens who enjoy appropriate benefits as established by legislation.

Article 34. Attending physician

The attending physician can be chosen directly by a patient or assigned by the administrator of a health care institution or its subordinate department. The duties of the attending physician are prompt and qualified examination and treatment of the patient. The patient has the right to ask for another physician.

The physician has the right to refuse further management of a patient if the latter does not carry out medical instructions or intramural rules of the health care institution, provided that this would not endanger the life of the patient and health of the public.

The physician is not liable for the health of a patient if the latter refuses to carry out medical instructions or does not adhere to the regimen established for him.

Article 35. Types of treatment and preventive care

The State guarantees accessible, socially acceptable primary treatment and preventive care as the chief component of medicosanitary aid which implies consultation of a physician, simple diagnostic procedures and treatment of the main and most widespread diseases, trauma and poisoning, preventive measures, referral of patient for specialized and highly specialized care. Primary treatment and preventive care are rendered mainly on a territorial basis by family physicians or other general practitioners.

Specialized (secondary) medical-preventive care is rendered by physicians who have the appropriate specialization and can provide more qualified consultation, diagnosis, prevention and treatment than general practitioners.

Highly specialized (tertiary) medical-preventive care is rendered by physicians or a team of physicians who have appropriate training in the field of diseases that are difficult to diagnose and treat, in the case of treatment of diseases requiring special diagnostic and therapeutic methods, as well as for the purpose of diagnosing and treating rare diseases.

Article 36. Patient referral abroad

Ukrainian citizens may be referred abroad for treatment in case of need for a type of medical care that cannot be rendered in Ukrainian health care institutions.

State agencies are obliged to assist Ukrainian citizens in travel and stays abroad.

Procedure for referring Ukrainian citizens abroad for treatment is established by the Ukrainian Cabinet of Ministers.

Article 37. Urgent and emergency medical care

Medical workers must render first emergency care in cases of accidents and acute diseases. Medical care is provided by the medical first aid service or closest medical-preventive institution, regardless of departmental subordination and forms of ownership with subsequent reimbursement of expenses.

In urgent cases, when it is impossible to administer on-site care due to absence of medical personnel, enterprises, institutions, organizations and citizens must provide transportation to move the victim to a medical-preventive institution. In such cases, first aid should also be given by militia, fire department, accident service personnel, vehicle operators and representatives of other occupations upon whom this duty is placed by legislation and official instructions.

If there is a threat to a patient's life, medical personnel and other citizens have the right to use any available vehicle to get to the patient's location in order to administer urgent care or transport him to the nearest medical-preventive institution.

Administration of free medical care to citizens in emergency situations (natural calamity, accident, disaster, mass poisoning, epidemic, epizootic, radiation, bacteriological and chemical contamination, etc.) is the duty, first of all, of specialized brigades of the urgent medical care service, with reimbursement in full of necessary expenses of local health care institutions at the expense of centralized funds.

Citizens who were involved in rescuing people and helped render medical care in an urgent or emergency situation are guaranteed free treatment and financial compensation for harm to their health and property, if necessary, following procedure established by legislation.

Government agencies and special institutions that service medical institutions are held liable for delayed and poor quality of medical care.

Article 38. Choice of physician and medical institution

Each patient has the right to free choice of physician, if the latter is available.

Every patient has the right, if warranted by his condition, to be accepted in any State medical-preventive institution of his choice, if this institution is able to provide the needed treatment.

Article 39. Obligation to provide medical information

The physician must explain to the patient, in understandable terms, the condition of his health, purpose of suggested tests and therapeutic measures, prognosis of possible development of disease, including presence of risk to life and health.

The patient has the right to see his case history and other documentation that could be useful in subsequent treatment.

In special cases, when complete information could harm the patient's health, the physician can limit it. In this case, he informs family members or the patient's legal representative, with consideration of the patient's personal interests. The physician takes the same action if the patient is unconscious.

Article 40. Physician's confidentiality

Medical workers and others who learned about a citizen's illness, physical examination, and results, his intimate and family life in the course of carrying out their professional or business duties, do not have the right to divulge such information, with the exception of instances stipulated in legislative acts.

When privileged medical information is used in the educational process or research, including instances where it is published in the special literature, the patient must remain anonymous.

Article 41. Sick leave

Citizens are granted leave from their work for the duration of their illness involving temporary disability, with payment of social insurance benefits following procedure established by Ukrainian legislation.

Article 42. General conditions of medical intervention

Medical intervention (use of diagnostic, preventive or treatment methods affecting the human body) is permitted only if it cannot cause harm to the patient's health.

Medical intervention that entails a risk to the patient's health is permitted as an exception, when there is an acute need, if the potential harm of the diagnostic, preventive or having therapeutic method is less than the harm expected if intervention is denied, and it is impossible to eliminate the danger to the patient's health by other methods.

Risky diagnostic, preventive or treatment methods are deemed permissible if they meet current scientifically validated requirements, are aimed at preventing a real threat to life and health of the patient, used with the consent of the patient after he is informed about the possible harmful consequences, and the physician takes all measures appropriate to such cases to prevent detriment to the patient's health and life.

Article 43. Consent to medical intervention

The consent of an objectively informed competent patient is required for use of diagnostic, preventive and therapeutic methods. If the patient has not reached the age of 15 years, or is declared legally incompetent, or cannot express his wishes due to his physical condition, medical intervention can be performed with the consent of parents or other legal representatives of the patient. Such intervention can be performed on individuals 15 to 18 years old or with legally diminished capacity with their consent and consent of their parents or other legal representatives.

In emergency cases when there is a real threat to the patient's life, the consent of the patient or his legal representatives to medical intervention is not required.

If absence of consent could lead to serious consequences for the patient, the physician must explain this to him. If even after this the patient refuses treatment, the physician has the right to get a written confirmation from him and, if this is unfeasible, to certify the refusal in the appropriate form in the presence of witnesses.

If the refusal is made by the patient's legal representative and it could have serious consequences for the patient, the physician must report this to legal guardianship and trusteeship agencies.

Article 44. Use of preventive, diagnostic, therapeutic methods and drugs

In their practice, physicians must use the preventive, diagnostic and therapeutic methods, and drugs permitted by the Ukrainian Ministry of Health.

In the interests of curing a patient and with his consent and, with respect to minors and those declared legally incompetent, the consent of their parents, guardians or trustees, the physician can use new, scientifically validated diagnostic, preventive, therapeutic methods and drugs, which have not yet been allowed for general use. With respect to individuals 15 to 18 years old or declared to have limited legal competence, use of such methods and drugs can be made with their consent and the consent of their parents or other legal representatives.

The procedure for using the above-mentioned diagnostic, preventive, therapeutic methods and drugs is established by the Ukrainian Ministry of Health.

Article 45. Biomedical experiments on humans

Biomedical experimentation on humans is permitted for a socially useful purpose, provided: they are scientifically validated, the possibility of success outweighs the risk of serious consequences to health or life, there is announcement of use of the experiment, the subject is fully informed about what the experiment entails and has given his consent, and doctor-patient confidentiality is observed when necessary. It is prohibited to carry out research experiments on patients who are incarcerated or prisoners of war, as well as to carry out therapeutic experiments on people whose illness has no direct bearing on the purpose of the study.

The procedure for carrying out biomedical experiments is regulated by legislative acts of the Ukraine.

Article 46. Donation of blood and its components

Blood for therapeutic use is donated voluntarily by citizens. It is prohibited to take blood by force, or from individuals whose diseases could be transmitted to a recipient or harm his health. Health care agencies and institutions, with the cooperation of administrators of enterprises, institutions and organizations, must develop donorship in every way.

Donors enjoy benefits as stipulated by Ukrainian legislation.

Article 47. Transplantation of organs and other anatomical material

The method of donor to recipient transplantation of organs and other anatomical material is used according to specific legislative procedure, with their consent or with the consent of their legal representatives, provided that use of other means and methods of supporting life, restoration or improvement of health does not yield the desired results, and the harm sustained by the donor is outweighed by the harm that the recipient is facing.

Article 48. Artificial insemination and embryo implantation

Artificial insemination and embryo implantation are performed according to conditions and procedure established by the Ukrainian Ministry of Health, at the request of a competent woman on whom such procedures are performed, provided there is written consent of her husband, donor anonymity and observation of medical confidentiality.

Disclosure of a donor's name could occur following procedure stipulated in legislation.

Article 49. Use of sterilization methods

Sterilization methods can be used at the discretion or with the voluntary consent of the patient in accredited health care institutions when medically indicated, as stipulated by the Ukrainian Ministry of Health.

Article 50. Voluntary interruption of pregnancy

Artificial interruption of a pregnancy (abortion) can be carried out in accredited health care institutions within 12 weeks of conception at a woman's discretion.

Abortions can be performed between the 12th to 28th weeks of the gestation period with social and medical indications in individual cases and following procedure established by the Ukrainian Cabinet of Ministers.

Article 51. Sex change procedures

At the request of the patient and in accordance with biomedical and sociopsychological indications established by the Ukrainian Ministry of Health, medical intervention can be carried out at accredited health care institutions for the purpose of sex change (correction).

A medical certificate is issued to the individual who has undergone a sex change, on the basis of which the question of appropriate changes in his legal status is subsequently settled.

Article 52. Medical care of patients in critical condition

Medical workers must render a full volume of medical care to a critical patient. Such care can also be administered in specially created health care institutions that enjoy benefits from the State.

Active life-support measures are stopped if irreversible death has been determined. Procedure for discontinuing such measures, concept and criteria of death are defined by the Ukrainian Ministry of Health, in accordance with modern international requirements.

It is prohibited for medical workers to practice euthanasia—the deliberate acceleration of death or killing of an incurable person in order to stop his suffering.

Article 53. Special preventive and therapeutic methods for socially dangerous diseases

Health care agencies and institutions must carry out special preventive and therapeutic measures for socially dangerous diseases (tuberculosis, mental illness, sexually-transmitted diseases, AIDS, leprosy, chronic alcoholism, drug addiction), as well as quarantinable diseases, in order to safeguard the health of the public.

The procedure for hospitalization and treatment of such patients, including forced steps, is established by legislative acts of the Ukraine.

Article VI. Supplying Drugs and Prostheses

Article 54. Procedure for supplying drugs and immunological agents

Citizens are supplied with drugs and immunobiological agents through pharmacy and medical-preventive institutions.

The procedure for supplying drugs and immunobiological preparations to the public free or on preferential terms is defined by Ukrainian legislation.

Pharmacy and medical-preventive institutions may dispense only the drugs and immunobiological agents, use of which is permitted by the Ukrainian Ministry of Health, and they are responsible for maintaining appropriate conditions for their storage and sale, as well as having the mandatory assortment of drugs and immunobiological agents, including the necessary reserve in case of epidemic diseases, natural calamities and disasters.

The Ukrainian Ministry of Health regularly informs health care workers and the public about drugs and immunobiological agents, the use of which is permitted.

Article 55. Manufacture of drugs and immunobiological agents

Manufacture of new drugs and immunobiological agents for medical purposes is allowed with permission of the Ukrainian Ministry of Health, after determination of their therapeutic or prophylactic efficacy.

The quality of drugs and immunobiological agents must conform to requirements in the Ukrainian State Pharmacopoeia and specifications approved following established procedure.

The Ukrainian Ministry of Health monitors the quality of drugs and immunobiological preparations manufactured by enterprises of the Ukraine.

Article 56. Supplying prosthesis

When necessary, prosthesis, orthopedic and corrective items, eyeglasses, hearing aids, equipment for therapeutic physical culture and special means of transportation are provided to citizens.

The categories of individuals eligible for free or preferential terms for the above items and supplies, as well as conditions and procedure for furnishing them, are established by Ukrainian legislation.

Section VII. Mother and Child Care

Article 57. Incentives for mothers. Guaranteed health care for mothers and children

The State protects and offers incentives for mothers.

Mother and child health care is provided by: organizing a broad network of gynecological, medicogenetic and other offices, maternity homes, sanatoriums and rest homes for pregnant women and mothers with children, creches, kindergartens and other children's institutions; granting maternity leave with payment of social insurance benefits and allowing work breaks to nurse the infant; paying, according to established procedure, benefits related to the birth of a child and benefits for staying at home to care for a sick child; prohibition of employment of women in heavy and unhealthy industries, transfer of pregnant women to light work with retention of average earnings; improvement and sanitization of living and working conditions; elimination of negative ecological factors; State and social assistance to families, and other measures following procedure established by Ukrainian legislation.

For purposes of safeguarding the health of a woman, she has the right to make the decision to have children.

Article 58. Medical care for pregnant women and neonates

Health care institutions provide qualified medical supervision in the gestation period, in-hospital medical care at the time of delivery, treatment and preventive care of the mother and newborn infant.

Article 59. Concern for strengthening and protecting the health of children and adolescents

Parents must be concerned about the health of their children, their physical and spiritual development, and having them lead a health lifestyle. If this duty is not performed, and this causes substantial harm to a child's health, the guilty parties can be deprived of parental rights in accordance with established procedure.

In order to rear a healthy young generation with harmonious development of physical and spiritual strength, the State provides for development of a broad network of nursery schools, boarding schools, health centers, vacation camps and other children's institutions.

Children who are reared in children's institutions and attending school are provided with the necessary conditions to safeguard and strengthen health, and hygienic education. Conditions for study and work load, as well as requirements as to class schedules, are defined in coordination with the Ukrainian Ministry of Health.

Article 60. Medical care of children and adolescents

Medical care is provided to children and adolescents at medical-preventive and health institutions, pediatric polyclinics, departments, dispensaries, hospitals, sanatoriums and other health institutions. Children are given free travel passes to State pediatric sanatoriums.

Children and adolescents are under clinical supervision.

Article 61. Child nutrition

For children up to 3 years old, the State provides for high-quality formulas and other baby food produced commercially from ecologically pure raw materials.

State sanitary oversight agencies are charged with monitoring sanitary-hygienic and other standards for baby foods.

Article 62. Monitoring child health protection in child-rearing and educational institutions

Health care agencies and institutions, along with public education agencies and institutions, with the participation of public organizations, monitor health protection of children and implementation of health-improving measures.

Article 63. State aid to citizens in caring for children with physical or mental developmental defects

Children with developmental physical or mental defects requiring sociomedical aid and special care may, at the discretion of their parents or individuals who replace them, be placed in child centers, children's homes and other children's institutions at the State's expense.

Sociomedical aid is provided for families or other individuals and institutions with such dependent children following procedure established by the Ukrainian Cabinet of Ministers.

Article 64. Benefits for mothers with a sick child

When it is impossible to hospitalize a sick child or there are no indications for hospital care, the mother or other family member caring for the child can be given leave from work, with payment of benefits from the social insurance fund in accordance with established procedure. In the case of hospital treatment of children up to 6 years old, as well as severely ill older children, requiring maternal care in the opinion of physicians, mothers or other family members are given the opportunity to remain with the child in the medical institution, with provision of free food and living conditions, and payment of social insurance benefits in accordance with established procedure.

Article 65. Monitoring vocational training, apprenticeship, and working conditions of adolescents

On-the-job training of adolescents is permitted in accordance with legislation in occupations that are consistent with their age, physical and mental development, and

health status. Vocational and on-the-job training are carried out under regular medical supervision.

Health care agencies and institutions, together with proprietors of enterprises, institutions, organizations, as well as vocational-technical education agencies, public education agencies and public organizations monitor adolescent working conditions, as well as implementation of special measures aimed at disease prevention.

Article 66. Mandatory medical certification of working adolescents

Medical certification of adolescents is mandatory for their employment. Medical certification of employed adolescents must be carried out regularly, at least once a year.

Section VIII. Medicosanitary Support of Sanatorium-Resort Care and Vacations

Article 67. Medicosanitary support of sanatorium and resort care

Sanatorium and resort institutions carry out their work following procedure stipulated in resort legislation. In order to provide for appropriate treatment and preventive care, the opening of a sanatorium-resort institution, establishment of its specialization (medical field), medical indications and contraindications for sanatorium and resort therapy are coordinated with the Ukrainian Ministry of Health or its authorized agency.

The need for sanatorium-resort treatment is determined by a physician on the basis of the patient's condition and backed up by medical documentation in accordance with the form established by the Ukrainian Ministry of Health.

Health care agencies must give scientific-methodological and consultant aid to sanatorium and resort institutions.

State monitoring of treatment and preventive care in sanatorium-resort institutions is implemented by the Ukrainian Ministry of Health and its authorized agencies, which have the right to suspend the activities of such institutions due to violation of legislation on health care or legal rights and interests of children, in accordance with procedure established in legislative acts.

Article 68. Medicosanitary support of vacations

Proprietors and administrators of rest homes, boarding houses, tourist centers, other enterprises, institutions and organizations involved in organizing vacations for the public must provide healthy and safe conditions, adhere to health care legislation and sanitary-hygienic standards, and offer the opportunity for rendering necessary treatment and preventive care to vacationers.

Health care agencies implement State control of medicosanitary support of the vacationing public.

Section IX. Expert Medical Opinions

Article 69. Sociomedical expertise on incapacity for work

An expert opinion on temporary disability of citizens is provided at health institutions by a physician or commission of physicians, whodetermine the necessity for work leave because of illness, injury, pregnancy and childbirth, to care for a sick family member, during quarantines, for prosthetic services, sanatorium-resort treatment; they determine the necessity and duration of temporary transfer of an employee to a different job because of illness following established procedure, and they also make decisions on referral to a sociomedical expert commission for determination of existence and severity of prolonged or permanent disability.

Expert evaluation of long-term or permanent disability is made by sociomedical expert commissions, which determine the severity and cause of disability, indicate jobs and occupations that invalids can handle, check propriety of using the labor of invalids according to the conclusion of the expert commission, and assist in restoring their fitness for work.

The conclusions of sociomedical expert agencies as to conditions and nature of employment of invalids are binding on proprietors and management of enterprises, institutions and organizations.

Procedure for organization and implementation of sociomedical expertise is established by the Ukrainian Cabinet of Ministers.

Article 70. Military medical expertise

Military medical expertise determines fitness for military service of draftees, military personnel and reservists, it determines the causative relationship of diseases, wounds and trauma to military service, and the necessity and conditions for use of sociomedical rehabilitation and aid for military personnel.

Expert military medical opinions are provided by military medical commissions formed under military commissariats and health care institutions under the Ukrainian Ministry of Defense, Ukrainian Security Service and other military formations.

Procedure for organization and providing a military medical expert opinion is established by the Ukrainian Cabinet of Ministers.

Article 71. Forensic medical and forensic psychiatric expertise

Expert forensic medical and forensic psychiatric opinions are ordered by an individual conducting an inquest, investigator, prosecutor or court according to procedure established by legislation, in order to answer questions requiring special knowledge in the field of forensic medicine or forensic psychiatry.

The Ukrainian Ministry of Health implements organizational supervision of the forensic medical and forensic psychiatric services.

Article 72. Autopsies

Autopsies are performed in order to determine causes and mechanisms of patient death.

Autopsies are mandatory if there is suspicion of murder, as well as when death of a patient occurred in health care institutions, with the exception of cases stipulated in the third part of this article.

An autopsy may not be performed if there is written objection by close relatives or documented expression of the decedent's wishes, in the absence of suspicion of a violent death, or on the basis of religious and other valid reasons.

Procedure for performing autopsies is determined by the Ukrainian Ministry of Health.

Article 73. Alternative medical expert opinion

If a citizen disagrees with the State medical expert opinion and in other instances stipulated by legislation, an alternative medical (medicosocial, military medical, forensic medical, forensic psychiatric and others) opinion or autopsy may be carried out at the request of the citizen.

Alternative expert medical opinions are provided by specialists in the pertinent field and with the appropriate qualifications. Citizens make an independent choice of expert institution and experts.

Procedure and conditions for obtaining an alternative expert medical opinion are determined by the Ukrainian Cabinet of Ministers.

Section X. Medical and Pharmaceutical Activities

Article 74. Engaged in medical and pharmaceutical work

Individuals with appropriate specialized education who meet unified qualification requirements may engage in medical and pharmaceutical work.

As an exception, by special permission of the Ukrainian Ministry of Health or authorized health care agency, individuals without specialized education are allowed to work in the field of folk and nontraditional medicine.

Unified qualification requirements for individuals engaged in specific types of medical and pharmaceutical work, including the field of folk and nontraditional medicine, are established by the Ukrainian Ministry of Health. Administrators of health care institutions and agencies which have the right to issue permits (licenses) for individual entrepreneurial activities in the field of health care are responsible for adherence to the said qualification requirements.

Individuals who have undergone medical or pharmaceutical training in educational institutions of foreign countries are permitted to engage in professional activities after their qualifications are checked in accordance with procedure established by the Ukrainian Ministry of Health, unless otherwise stipulated in legislation or international agreements, in which the Ukraine participates.

Article 75. Training, retraining and advanced training of medical and pharmaceutical workers

Training, retraining and advanced training of medical and pharmaceutical workers are provided by pertinent secondary specialized and higher educational and research institutions, institutions for advanced training and retraining of personnel, as well as internship, clinical residency, postgraduate and doctoral programs, in accordance with educational legislation.

Syllabuses and curriculums for training, retraining and advanced training of medical and pharmaceutical workers are coordinated with the Ukrainian Ministry of Health in accordance with established procedure.

Article 76. The Ukrainian physician's Oath

Graduates in medical specialties of higher medical educational institutions take the Ukrainian physician's Oath.

The text of the Ukrainian physician's Oath is approved by the Ukrainian Cabinet of Ministers.

Article 77. Professional rights and benefits of medical and pharmaceutical workers

Medical and pharmaceutical workers have the right to: a) engage in medical and pharmaceutical activities in accordance with their specialty and qualifications; b) appropriate working conditions; c) advanced training and retraining at least once every 5 years in pertinent establishments and institutions; d) free choice of tested forms, methods and means of work, adoption of modern advances in medical and pharmaceutical science and practice in accordance with established procedure; e) free use of social, ecological and special medical information essential to performance of professional duties; f) mandatory insurance at the expense of the proprietor of the health care institution in case of harm to their life and health related to performance of professional duties, in the instances stipulated by legislation; g) social aid on the part of the State in case of illness, mutilation or other cases of disability occurring in connection with performance of professional duties; h) establishment in State health care institutions of average rates and salaries on a level no lower than the average wages of industrial workers; i) shortened work day and additional paid leave in the cases established by legislation; j) preferential pensions; k) free use of apartment with heat and electricity for those living in rural areas, preferential terms for land taxes, credit, acquisition of a farm and construction of their own housing, acquisition of motor vehicles;

l) priority in receiving medical-preventive care, drugs and prostheses; m) form scientific medical societies, professional unions and other social organizations; n) legal protection of professional honor and dignity.

Legislation may provide for other rights and benefits for medical and pharmaceutical workers. Employee benefits established by enterprises, institutions and organizations to which said workers render medicosanitary aid may also extend to them.

Article 78. Professional duties of medical and pharmaceutical workers

Medical and pharmaceutical workers have the duty to: a) cooperate in safeguarding and strengthening the health of the public, prevention and treatment of diseases, provide prompt and qualified health and medical care. b) administer free urgent medical care to the public in case of accident or other emergency situations; c) disseminate scientific and medical information among the public, campaign for a healthy lifestyle, including presentation of said workers as models; d) adhere to requirements of professional ethics and deontology, and maintain medical cônfidentiality; e) constantly advance professional knowledge and skill; f) render consultant aid to their coworkers and other health care workers.

Medical and pharmaceutical workers also have other duties as provided in legislation.

Section XI. International Collaboration

Article 79. International collaboration in the field of health care

The Ukraine is a participant in international collaboration in the field of health care, member of the World Health Organization (WHO) and other international organizations. The State guarantees to said organizations appropriate conditions on the territory of the Ukraine, cooperates in expansion an deepening of the Ukraine's participation in measures that they carry out.

In accordance with its international legal obligations, the State participates in implementation of international health care programs; it exchanges ecological and medical information; it assists in professional and scientific contacts between health care workers, exchange of progressive methods and technology, export and import of medical equipment, drugs and other merchandise essential to health, activities of joint enterprises in the field of health care; it organizes joint training of specialists, develops and supports all other forms of international cooperation that are not in contradiction to international law and national legislation.

Health care institutions, citizens and associations thereof have the right to conclude, in accordance with existing legislation, agreements (contracts) with foreign juridical and physical entities concerning any form of collaboration, to participate in the activities of pertinent international organizations, and to engage in foreign economic activities.

Illegal restriction of international collaboration on the part of State agencies and officials may be appealed following established procedure, including court action.

Section XII. Liability for Violation of Health Care Legislation

Article 80. Liability for violation of health care legislation

Individuals guilty of violating public health care legislation bear civil, administrative or criminal liability in accordance with legislation.

Decree on Putting Into Effect the 'Fundamentals of Health Care Legislation of the Ukraine'

937C0407C Kiev GOLOS UKRAINY in Russian 15 Dec 92 pp 9-13

[Decree of the Supreme Soviet of the Ukraine On Putting Into Effect the "Fundamentals of Health Care Legislation of the Ukraine," signed by I. Plyushch, chairman of the Ukrainian Supreme Soviet, on 19 Nov 92]

[Text]The Supreme Soviet of the Ukraine hereby decrees:

1. To put into effect the Fundamentals of Health Care Legislation of the Ukraine as of the day of their publication.

2. To establish that existing legislative acts of the Ukraine apply insofar as they are not in contradiction to these Fundamentals until Ukrainian legislation is brought into line with the Fundamentals of health care legislation of the Ukraine.

3. The Ukrainian Cabinet of Ministers is to:—submit to the Supreme Soviet of the Ukraine suggestions on putting Ukrainian legislative acts into line with the Fundamentals of Health care legislation of the Ukraine before 1 February 1993;—adopt enforceable enactments on application of the Fundamentals of health care legislation of the Ukraine, referred by said Fundamentals to the purview of the Ukrainian Cabinet of Ministers, before 1 November 1993.—bring other decisions of the Ukrainian Government into line with the Fundamentals of Health Care Legislation of the Ukraine and implement addition of appropriate amendments to enforceable enactments of ministries, departments and other State administrative central agencies of the Ukraine before 1 November 1994;—elaborate and adopt scientifically validated norms for funding health care.

4. The Commission for Public Health Affairs of the Ukrainian Supreme Soviet is to implement monitoring of execution of this Decree.

Academician Sergeyev on Causes of Pharmaceuticals Shortage

947C0119C Moscow TRUD in Russian 9 Oct 93 p 3

[Article by Russian Academy of Medical Sciences Academician Pavel Sergeyev: "Pills to Cure Developed Idiocy: How We Became a Medicine-Free Power"]

[Text] **Much is being said and written today about the chaos and confusion reigning in pharmaceutical support to the Russian population. But this catastrophical situation did not come about all at once. Our current woes are bitter payment for entire decades of thoughtless decisions and actions.**

My career in pharmaceuticals began many years ago. In the early 1970s I was already the director of the department of molecular pharmacology and radiobiology at the Moscow Medical Institute No 2. Once I had the occasion to talk with a certain highly placed worker at the USSR Council of Ministers on the state of medical science. I said then that in another 10-15 years our state would be completely dependent upon the West for pharmaceuticals. Domestic medical industry was developing at a loss, a large share of capital investments was being sent to the GDR, Hungary, Czechoslovakia, Poland and Bulgaria, while our pharmaceutical factories were shutting down. A crisis was to be expected. I was asked to write all of this down and take the materials over to the Council of Ministers.

I worked daily for a month and a half on my concept of the state of pharmaceutical science in the country. Then, after sending the materials I began waiting for a response. But unfortunately no one made the effort to answer me. Then I sent a letter to the CPSU Central Committee. Once again there was no reply.

In the heyday of perestroyka I was invited together with Academician M. Mashkovskiy and Academician R. Glushkov to join Gorbachev's staff, and we were asked to draft a presidential edict on pharmaceuticals. For 3 months we conducted serious analytical work, which culminated in a draft edict. It's not known whose fault it was, but this edict never was signed. For years I appeared before public health committees of the Russia and the USSR, roamed the ministry hallways, and expended energy trying to prove something patently obvious—people need pharmaceuticals as much as they need bread.

In late 1991 a concrete, fully thought out Russian state program was finally drawn up and approved. The strategic line of development of pharmaceutical science and of provision of medicines to the population was finally defined "on paper." But alas, once again things never went farther than this.

As before, the country continues to lack a unified program of research in pharmacology. We have over 40 medical VUZes, and all of them have pharmacology departments, but no one is coordinating their work. The absence of planning and control encourages inactivity.

On the other hand the road that must be traveled by medicines already in existence to the patient is infinitely complex and long. So much coordination with numerous committees, commissions and experts councils must be done! It takes an average of 10-12 years to create a new pharmaceutical, while the process of introduction sometimes drags on for decades! Often an original preparation that we could have produced for ourselves and sold abroad grows obsolete, never getting beyond the paperwork stage. In the meantime in developed countries it usually takes 2-3 years to introduce a high quality preparation.

Why does this happen? There's no secret here. We simply lack a nationwide system for the synthesis and introduction of pharmaceuticals, and we do not have a unified sector producing them. Throughout the world, pharmaceuticals are made by huge firms in which the processes of scientific development of pharmaceuticals and their introduction into production are combined. In our country we do not have a single firm of this kind. And consequently a preparation that comes into being in some university department also often "dies" there, having been unable to make it into production. Another misfortune lies in the fact that our pharmaceutical enterprises have fallen far behind modern requirements in terms of their equipment.

As I see it, one of the greatest misfortunes is the absence of state orders for medicinal resources. Consequently we also lack a program for providing the country with pharmaceuticals, one based on a clear idea of what we have for today, what preparations are suitable for use, and which have become hopelessly obsolete, what will be needed tomorrow, including the amount that will have to be purchased abroad, and precisely what will have to purchased there. We do not have any kind of service that could determine the population's demand for pharmaceuticals, draw up state orders, and distribute pharmaceuticals in optimum fashion!

No country in the world can completely satisfy its demand for pharmaceuticals by its own production. Japan for example, which has a highly developed pharmaceutical industry, imports many more pharmaceuticals than it exports. Clearly it would be impossible and unsuitable for Russia to do away with imports of pharmaceuticals. But today the ratio between exports and imports is 1:20. This is of course extremely disadvantageous to the country, which has all of the potential to make this ratio equal to 1:2 or 1:3.

In the last year the pharmaceutical supply situation became even more tragic. The collapse of the economy, and the tumultuous and inarticulate confusion in the higher echelons of power have had a devastating effect on the supply of pharmaceuticals to the common people. The pharmacies are empty, while the warehouses are overfilled—they are holding pharmaceuticals back in

anticipation of new, even fantastically higher prices. What is the Russian Ministry of Health doing in this situation?

In the last 15-20 years—that is after it was separated out of the Ministry of Medical and Microbiological Industry, the Ministry of Health has done nothing about pharmaceuticals, and for practical purposes it has even avoided drawing up state orders.

The Extraordinary Pharmaceutical Committee was organized in August 1991, but because of its total incompetence it didn't do anything, and it was soon abolished.

Then Academician A. I. Vorobyev organized an expert council on pharmaceuticals when he became minister. His work also recalled running in place. When the council held meetings, foreign firms always had their ears to the wall, and their interests were defended by experts discussing the fate of a given preparation. And in my opinion it was not until the new minister assumed his post that we finally began fighting the flawed system of distributing and selling pharmaceuticals, one in which the state appropriated millions of rubles' worth of foreign currency to acquire pharmaceuticals abroad, while patients continued to remain without therapeutic assistance. "Glorious" was the legacy left to the new minister. Western states had given us loans for the purchase of pharmaceuticals, but as a result of unforgivable mismanagement they were returned unused. Large sums of foreign currency idled in safes of the Pharmacological Committee. Its former chairman visited companies in different countries of the world 10-15 times each year. And even now he continues to manage international ties in the Pharmacological Committee!

The new minister is not responding to the administration's lead, he is trying to fight it, and this does him honor. But it is very important for him to create a team of people around him from different fields of pharmacological industry and pharmacological science, a team of honest people of like mind. It is extremely necessary to distribute orders for imported preparations as quickly as possible—after all, thousands of people are waiting!

And of course, we need to change the system under which all hard currency is transferred to local public health departments. Pharmaceutical merchants have rushed headlong to them, easily finding a common language with people who have little understanding of the highly complex issues of purchasing imported preparations. The coordinating role must remain with the Center. Otherwise this idiotic waste of state resources will continue unavoidably. And after all, we have very few of these resources left.

Academician Komarov Comments on Demographics, Public Health

947C0119B Moscow TRUD in Russian 24 Sep 93 p 2

[Interview with Prof Yuriy Mikhaylovich Komarov, corresponding member of the Academy of Technological Sciences and doctor of medical sciences, by Albert Kozlov; place and date of interview not given: "What Are We Eating, What Are We Breathing? The Health of Russians: The Situation is Extremely Alarming"]

[Text] Until the late 1980s Russia's population growth exhibited a stable trend—3.5-7 percent every 5 years. In 1991 we reached the mark at which the coefficient of natural growth was only 0.7 per thousand residents, and beginning in 1992 the population actually began to decrease. The number of deaths exceeded the number of births by 204,000 people. This year this process has accelerated.

A TRUD correspondent asked Professor Yu. Komarov, doctor of medical sciences, corresponding member of the Academy of Technological Sciences and general director of the Medsotsekonominform Scientific-Production Association, to comment on so lamentable a fact.

[Komarov] In and of itself, zero population growth or even a decrease in population is a widespread phenomenon in the world. However, Russia's situation is unique in that the transition to a natural decrease is caused chiefly by a decrease in the birth rate. In the last 5 years 900,000 persons were born in our country, or 36 percent less than in the preceding 5 years, and if we include 1992, the number is 195,000 less. The birth rate in Russia has become the lowest among developed countries.

The second factor influencing the population decrease is a sharp worsening of the health of people and growth of mortality. This raises the problem of the health and life span of the population to the rank of national problems determining the survival and prospects of the nation.

The decline in birth rate and health is a consequence of the socioeconomic and ecological crisis, the low level of financing of public health, insufficient flexibility of its structures, and the absence of any strategy in this direction.

[Kozlov] It has usually been believed that assets invested directly into the development of public health produce the greatest impact in improving the people's health. But today the principal causes of morbidity and mortality are associated with living conditions and way of life.

[Komarov] That would be the most correct approach to take to this problem. The quality of life of Russians may be portrayed in general form as follows. In 1985 we were 68th in the world in gross production per capita, and 77th in level of personal consumption. This was respectively 39.9 and 25.8 percent of the levels in the USA. In the past year the standard of living of Russians dropped further by a factor of two. Consumer prices increased by 26 times (in 1992), while average wages increased by only 13 times, and the rate of growth of pensions and assistance was a third behind the growth of wages. This year these indicators are even more deplorable.

A drop in real income has resulted in a worsening of the consumption structure. The proportion of food expenses

in the family budget grew by an average of 60 percent (85 among the poorest and pensioners); in this case consumption of meat, oils, vegetables and fruits decreased by a time and a half. On the other hand consumption of potatoes and grain products of lesser value in dietary respects increased. Hence the protein shortage in the Russian diet was 25 percent, the vitamin C shortage was 50 percent and the group B and A vitamin shortage was 20-30 percent.

Paradoxical as it may seem, people in countries in which the quality of protects against avitaminosis gulp down vitamin supplements. In our country, where the diet lacks in nutritional respects, the situation is reversed. The vitamins we produce of such low volume (not to mention their quality) that if we were to give them to all Russians, each person would receive only one multiple-vitamin pill a year. In the meantime in order to satisfy the country's demand at the Western level, we would need to spend just $1.50 per Russian on the development of domestic industry.

[Kozlov] Yuriy Mikhaylovich, what influence is the ecological situation in the country having on our health?

[Komarov] Over 60 million Russians live under conditions in which the maximum permissible concentrations of toxins in the air are continually exceeded. Approximately half of our population drinks water that fails to satisfy hygienic requirements. The work places of around 5 million persons in industry and a million in construction and transportation fail the safety standards, while 4.3 million work in conditions under which the concentration of toxins in the air of the work zone exceeds the standard.

In order for the scale of ecological contamination to become more understandable, let me say that each year over 50 million tons of exhausts from enterprises and motor transportation enter the air: This is 400 kilograms for every Russian. And in cities like Berezniki, Bratsk, Krasnoyarsk, Magnitogorsk, Novokuznetsk, Norilsk and Perm—a total of 84 cities—morbidity is 1.5-2 times higher than the country average.

[Kozlov] Your scientific-production association analyzed the causes of worker mortality. What diseases kill Russians most often?

[Komarov] It will seem strange, but what took first place in 1991 was suicide. Let me say right away that it is provoked by social problems and stress. A high percentage of losses also comes from work-related injury. And among diseases, circulatory ailments, neoplasms, and diseases of the respiratory and digestive tract have the lead.

The structure of health impairments is now determined chiefly by long-lasting chronic diseases. Once again there is a direct relationship to the state's strategy in health protection: We need a two- or three-time increase in outlays on public health, and an increase of several times on improvement of the environment and development of the social infrastructure. But the new powers are as hesitant to provide money for the health of people as were the former ones. This is why infectious diseases have begun spreading in our country once again. There are increasingly larger numbers of cases of acute intestinal infections, salmonellosis and viral hepatitis—many hundreds of thousands of cases per year. Cholera, which has been forgotten by most developed countries, is revealing itself more and more frequently. Tuberculosis is returning.

Women are a special problem. In the last 3 years their morbidity increased abruptly in connection with absence of proper diet, because of the shortage of proteins, vitamins and microelements. Maternal mortality is very high—four to five times higher than in developed countries. By the way, not a single developed country in the world has so many women dying from abortions as we do (Russia can be compared only to Tanzania). Moreover death could be prevented in 60 out of 100 cases.

[Kozlov] Are things any better with the health of men?

[Komarov] Unfortunately Russia is one of those countries in which "supermortality" among men is especially pronounced. In comparison with women, the mortality indicators for men of young and middle working age are four to five times higher. Only around 70 percent of urban and around 60 percent of rural men live to 60. In comparison with the USA, the FRG, Japan, France and Great Britain, men of what we might call "working age" die 2.5 times more frequently in our country.

[Kozlov] The figures are saddening, if not tragic. Is there a solution?

[Komarov] Our country's leadership must finally realize the simple truths. First, without health, there cannot be a healthy economy. And second, if the necessary emergency measures are not implemented very soon, in 7-15 years Russia will transform into a degraded society. While in developed countries up to 10-12 percent of the gross national product is allocated to public health, in our country no more than 3-4 percent is allocated. Each year more than $2,500 are spent per capita in the USA, while in our country 6,500 rubles were planned in 1993.

Each time, statistical bodies publish increasingly more alarming data indicating a decrease in life span and birth rate, growth in the number of suicides and murders, of venereal diseases, of alcoholics and drug addicts, congenital deformities, and disengagement of the people's "moral restraints." These are manifestations of a chronic disease in society, a menacing warning that unless the dangerous trends are curtailed, the country and the people may find themselves without a future. This danger is more terrifying than the economic and political crisis.

Today, there are practically no illusions left regarding the possibility for reforming our economic system swiftly, in a few years. Therefore despite the slogans, the social sphere, including public health, will once again be

financed on the basis of the residual principle, and it will experience even further degradation.

Sad as it may be, the conclusion we are forced to reach is this: The people's health is in serious jeopardy.

Cooperation and Aid From Greek Medical Center

947C0119A Moscow ROSSIYSKIYE VESTI in Russian 5 Nov 93 p iii

[Article: "Help Today, Benefit Tomorrow"]

[Text] Georgos Apostolopulos, a well known Greek businessman and the director of the Athens Medical Center, sent a large consignment of medications to Moscow as a gift to the Russian Ministry of Health.

G. Apostolopulos's medical center has been interacting closely with Russian medical personnel for a long time. He opened a first aid station in Moscow equipped with special machines for outpatient care brought in from Greece, there is a diagnostic center, and other forms of cooperation are developing. One other act of humanitarian assistance was carried out in G. Apostolopulos's Athens clinic—an extremely complex heart operation free of charge on Kseniya Lukidis, a girl from St. Petersburg whom doctors in Russia were unable to cure.

"Russia is a country with extremely rich resources, with talented people who like to work," said the Greek businessman. "Having gained their freedom, your people will be able to progress and flourish very quickly. The West needs to do more than just provide humanitarian assistance: It should also cooperate with Russia, it should not fear investing capital into its economy, and it should supply new technology. All of this will ultimately be advantageous to both sides."

PHARMACOLOGY AND PHYSIOLOGY

Neurophysiological Analysis of Mechanisms of Neuroendocrine Regulation Under the Stress and Antistress Effect of Delta-Sleep Inducing Peptide

947C0103A Moscow USPEKHI FIZIOLOGICHESKIKH NAUK in Russian Vol 24 No 4, Oct-Nov-Dec 93 pp 29-46

[Article by N.M. Malyshenko and A.V. Yeliseyev, Biomedical Problems Institute, Russian Federation Ministry of Health, Moscow; UDC 612.822.014.46:577.175.537]

[Abstract] Existing and newly published data on the mechanisms of the reaction of a number of structures of the brain and pituitary-adrenal system under stress were examined. Published information on the following topics was examined: the role of the hypothalamus and extrahypothalamic structures (the hippocampus, tonsils, septum, and reticular formation); the role of the adrenergic, seritoninergic, and cholinergic systems of the hypothalamus-reticulum-limbic complex; the role of neuropeptides; and delta-sleep inducing peptide [DSIP] and its biological role. In addition, the regulation of the pituitary-adrenal system and the functional activity and intercenter interrelationship of the structures of the brains in a stressed state of aggressive-defensive behavior and the effects of corticosteroids and DSIP were examined in a study of 982 adult male rats. The rat studies established that the development of aggressive-defensive behavior results in a marked restructuring of the functional activity of the hypothalamic-reticular-limbic structures and cerebral cortex, as well as in a change in the nature of intercenter interrelationships that correlate with a change in the content of corticosterone and DSIP in blood plasma. Specifically, the stressed state of aggressive-defensive behavior was accompanied by an elevation of corticosterone level from 12.29 +/- 0.5 to 126.1 +/- 1.5 mmol/l and a decrease in DSIP from 388.1 +/- 41.06 to 242.3 +/- 31.88 fmol/l. Also during aggressive-defensive behavior, the bioelectric activity of the rats' brains manifested a change in theta-rhythm spectrum, the integral strength of which (in μV/s) in the hippocampus rose from 18.8 +/- 3.6 (background) to 6.1 +/- 5.9. Theta-activity in the hippocampus thus increased from 31 to 54 percent. In the ventromedial hypothalamus theta-activity increased from 17 to 43 percent, and in the reticular formation of the midbrain it increased from 31 to 37 percent (this change was coupled with increases in respiration and heart rates). The correlation between DSIP level and corticosterone level during aggressive-defensive behavior was seen as especially noteworthy. Exogenous injection of DSIP against the background of advanced stress resulted in myorelaxation and elimination of aggression. Injection of DSIP before the development of aggressive-defensive behavior led to a decrease in corticosterone level from 12.29 +/- 0.5 to 9.64 +/- 0.7 mmol/l and to a less pronounced increase in the level of corticosterone in the rats' blood plasma after the onset of aggressive-defensive behavior than occurred without the injection of DSIP. New data regarding the structurofunctional organization of the inhibitory process under the effect of DSIP during aggressive-defensive behavior and the significant integration of nervous and hormonal factors in the mechanisms of its development were also obtained. DSIP was determined to function as a natural tranquilizer that increases resistance to stress. References 80: 19 Russian, 61 Western.

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20 APR 1994